CONSERVATION OF BIODIVERSITY

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4.1. Introduction

4.1.1. What is Biodiversity and Why Is it Important?

Biodiversity signifies a healthy environment and the ability of ecosystems to sustain their life support processes that provide the fundamental basis for human welfare. During the last century, climate change, pollution, and excessive and unsustainable use of natural resources have damaged biodiversity so severely that this situation now threatens human life.

Biodiversity is comprised of three components that are among the important parameters of sustainable development:

Genetic Diversity: Genetic diversity can be defined as biochemical packets that define the physical and biochemical characteristics of life and are passed on by heredity. Genetic diversity is measured by gene differences within a certain species, population, variety, sub-species, or race. These differences enable, for example, people to raise livestock and grow agricultural products, or a certain species to adapt to the changing conditions in the wild.

Species Diversity: A group of organisms with genetic similarities may interbreed, and out of this process fertile living creatures are generated which are called species. Species diversity is usually measured by total number of species within geographic boundaries.

Ecosystem Diversity: An ecosystem is composed of plants and animals, as well as abiotic materials such as soil, water, air, and minerals. The communities of living creatures have highly complicated functional relations among themselves and with their environments. Through these relations, the mechanisms of basic ecological processes such as water circulation, soil formation, and energy flow are generated. These processes supply the support systems necessary for the species communities and thus create a critical interdependency. In a sense, this interdependency is the phenomenon upon which the entire sustainable development approach rests.

4.1.2. Sustainable Development and Biodiversity

Sustainable development requires human beings to raise and improve their quality of life in harmony with and by conserving the balance of the ecosystems they are a part of and which supply the fundamental support to sustain their lives. In this context, the main components of sustainable development are economic feasibility, social equality, and environmental sustainability. The development of new and innovative policies for the sustainable use of biodiversity necessitates, foremost, a fundamental revision of national land-use policies and an earnest change in national policies concerning agriculture, animal husbandry, employment, and health. This holistic approach is also necessary for combating poverty and sustaining food security by preventing dependency on food imports. In this regard, endangered species, endemic species, their ecosystems and natural habitats must be protected. Likewise, the methods of produc-

tion and consumption of livestock, seafood, and pharmaceuticals need to be restructured in line with the sustainability approach.

The relationship between species conservation and sustainable development is important for biodiversity. The market prices of endangered species, especially those which are of economic value, are high because of their scarcity. If the people living next to these species are poor, they may be compelled to capture/hunt/gather and sell these species on the market. This means that their expectations of obtaining high earnings in a short period of time may totally annihilate their chances for economic development with sustainable means in the long run. It is, therefore, very important to conserve and improve native species and traditional production methods in agriculture, animal husbandry, and fishing and to observe the principles of geographic equality and inter-generational justice in using genetic resources.

Biodiversity cannot be conserved and sustained solely by creating protected areas. Special planning models, which are adopted as integral parts of national development policies, should be employed for regions, which are fragile and rich in biodiversity. Experience shows that in the protected areas, all lands, including the vulnerable areas, need to be classified according to how they are to be protected or utilized. For those lands for which utilization is permitted, income-generating activities should be introduced for the people living right in that region. These processes need to be accomplished in a participatory manner.

The issue also needs to be dealt with from the perspective of the interrelationship of biodiversity conservation and gender. It is a well-known fact that women and children are more affected by environmental problems. One should also bear in mind that women play important roles in conserving agricultural biodiversity. In regions where women's employment in agriculture is predominant, women are the key actors in sustaining native species and traditional production methods.

The forests provide economic benefits to persons, communities, and various sectors, but they are also a very important source for the realization of the common good, considering that they play important roles in mitigating climate change, generating water, combating soil erosion, enhancing human health, and conserving ecosystems (Konukçu, 1998). Economic development policies focusing solely on economic growth result in inaccurate pricing of forest utilization. One of the main objectives of sustainable forestry is to raise the welfare of the users in line with the overall national welfare, while keeping the principle of the common good at the forefront. The poverty of forest villagers cannot be resolved by clearing forestlands on a permanent basis. Keeping this reality in mind, forest resources need to be used consciously with sustainable methods and regulated with incentives through intermediary mechanisms (persons or groups).

On the other hand, accurate pricing of biodiversity, effective conservation, sustainable enterprising, correct selection of development methods, and awareness building among users are necessary for the optimal use and the perma-

nence of limited and non-renewable biological resources.

Policies intending to raise and at the same time sustain quality of life are now widely accepted, but they need to be expanded to include biodiversity. If we want to have environmental safety, it is also necessary to protect and sustain the quality of life of biodiversity of which the human being is a part.

4.1.3. International Responsibilities

During the United Nations Conference on Environment and Development, also known as the 1992 Rio Summit, the *Convention on Climate Change* and the *Convention on Biological Diversity* were opened for signature. *Agenda 21*, the *Rio Declaration*, and the *Forest Principles (Non-Legally Binding Authoritative Statement of Principles for a Global Consensus of the Management, Conservation and Sustainable Development of all Types of Forests)* were produced and laid down for the approval of the participating countries.

The Rio Summit was the largest ever international meeting (172 countries). Its importance also lies in the fact that it created at the global level a united political will and consensus about the necessity of structuring all systems in accordance with environmental values and principles of sustainable development.

Turkey signed the *Convention on Biological Diversity* (CBD) in Rio, and committed itself to carrying full responsibility for the conservation of the diversity of plants, animals, and the microbiological life within the limits of its national jurisdiction, to using biological resources in a sustainable manner, and to looking for ways to equitably share the benefits arising out of the utilization of biodiversity. The Convention is built upon the concept of sustainable development the formulation of which is "to ensure that humanity meets needs of the present without compromising the ability of future generations to meet their own needs". Significant changes need to be made in the use and management of our natural resources in order to implement the Convention.

4.1.4. The National Approach

As a Party to the *Convention on Biological Diversity*, Turkey made commitments regarding the conservation of biodiversity at national and global levels, and therefore acknowledged the vital value and the socio-economic significance of biodiversity. Turkey took upon itself the responsibility of achieving the objectives of the Convention, which are conservation of biodiversity, sustainable use of its components, and the fair and equitable sharing of the benefits arising out of the utilization of genetic resources. Since the Rio Summit, Turkey has taken important steps such as enacting legislation and making policy commitments to conserve biodiversity. The five-year development plans, the *National Environment Strategy and Action Plan*, the *National Strategy and Plan of Action on Biological Diversity*, and national and international laws and regulations are the main documents guiding the policies and implementations in Turkey. The *National Plan of Action of Turkey to Combat Desertification and Drought*, the completion of which is planned by the end of 2002, and the *Project for the Preparation of a Strategic*

Action Plan for the Conservation of Biological Diversity also deserve special attention. Aside from these action plans, there are also projects and implementations contributing to conservation of biodiversity. The gaps and/or conflicts in legislation and institutional structures, on the other hand, constitute the main impediments.

4.2. Biodiversity of Turkey

Turkey is shaped by the Northern Anatolian Mountains and in the south by the Taurus Mountains, the two ranges running parallel to each other. As such, it is a high altitude country characterized by geographic irregularities. Its land area is 779,452 km^2 and is surrounded by seas on three sides: The Black Sea, the Marmara, the Aegean and the Mediterranean. Its total coastline, with the exclusion of its islands, is 8,333 km. Inland waters cover 6 % of the land area. The total area of natural lakes is 906,000 hectares (ha), and the total area of artificial lakes is 380,000 ha. The largest lake in the country is the Lake Van, with an area of 374,000 ha, followed by the Lake Tuz with an area of 128,000 ha. The longest rivers in Turkey are Kızılırmak, Yeşilırmak, and Sakarya, all flowing into the Black Sea.

The climate of Turkey varies by regions. The southern and western coastal areas of the country are characterized by the Mediterranean climate, which results in warm, arid summers and temperate, rainy winters. The climate of the coasts of the Black Sea, on the other hand, is rainy and cold in all seasons. The Central and Southeastern Regions, which make up 40 % of the country, have a semi-arid climate.

In terms of biodiversity, Turkey is one of the rich countries of Europe and the Middle East, and ranks ninth on the European Continent in this regard. All of the seven geographical regions of the country display different climate, flora, and fauna characteristics. There is a number of different ecological regions each with its own endemic species and natural ecosystems: The Northeast Anatolia flora with its old colchic mountain forests, the steppe-type meadows of Central Anatolia, and the Mediterranean Region with the world's largest cypress (*Cupressus sempervirens*) and cedar (*Cedrus libani*) forests.

Turkey is rich in biodiversity in terms of species diversity, with its 120 mammals, more than 400 bird species, 130 reptiles, and close to 400 fish species. Turkey is also rich in wetlands. The Dalmatian pelican (*Pelecanus crispus*), which is an endangered species, breeds chiefly at the Lake Manyas, and on the deltas of the Gediz and Büyük Menderes Rivers. Another species of interest is the white-headed duck (*Oxyura leucocephala*), 70 % of the world population of which spend winters on Turkey's wetlands and particularly by the Lake Burdur. For the greater flamingo (*Phoenicopterus rubber*) one of the most important brooding areas in the Western Palearctic Region is the Lake Tuz, where there are two brooding colonies of 5,000-6,000 nests. There are also forest, steppe, wetland, coastal-marine, and mountain ecosystems which are home to these species and their habitats.

4.2.1. Genetic Diversity

The diversity of the geographic formation of Turkey and its location at the intersection of two important Vavilovian gene centers (the Mediterranean and the Near Eastern) are the reasons for high endemism and genetic diversity. This location also plays a very significant role in the origins of cereals and horticultural plants. There are five different "micro gene centers" in Turkey. There are 256 varieties of cereal cultivated from both native and imported races and certified over the last 30 years. Some 95 of these cereals are wheat varieties, 91 corn varieties, 22 barley varieties, 19 rice varieties, 16 sorghum varieties, 11 oat varieties, and 2 rye varieties (Ministry of Environment, 2001).

The flora of Turkey incorporates the wild varieties of important cultivated agricultural plant species and the genetic diversity of these species. There are about 200 native and other varieties of horticultural plants, including the 50 varieties and 100 species that are grown. This diversity also exists in fruit species, of which there are estimated to be 138. Anatolia is the gene center of the grapevine (*Vitis vinifera*) and is the homeland of the wild vine species (*Vitis silvestris*). Turkey has a rich genetic diversity of local farm animal species, too. However, the crossbreeding of native animals with foreign races is causing genetic depletion.

4.2.2. Species Diversity

Turkey is home to 75 % of the plant species that exist on the European continent, and one third of these species are endemic plants. The Anatolian fauna is also remarkably rich with its more than 80,000 species. Anatolia is the homeland of the fallow deer and the pheasant. There are mammals like the brown bear, wild boar, wolf and hyena in particular, more than 400 bird species and the Anatolian leopard, thought to be extinct. The Mediterranean and Aegean coasts are the habitats of such endangered species as *Monachus monachus*, *Caretta caretta*, and *Chelonia mydas*.

Turkey is one of the rare Mediterranean countries boasting the natural habitats of the Mediterranean monk seal, another species at high risk of extinction. Despite all the conservation efforts, the population of the Mediterranean monk seals in the Aegean Sea, the Mediterranean Sea, and the Black Sea does not remain stable. While in the 1970s the number of individuals was estimated to vary around 150 and 300, this figure is now below 100. The main reasons behind this depletion are intentional killings by fishermen, the destruction of habitats due to tourism developments and rampant urbanization, and diminishing stocks of fish caused by overfishing. This species has almost become extinct in the Black Sea and the Sea of Marmara.

The seas surrounding Turkey are rich in sea mammals (*Cetaceans*). The most significant ones are *Delphinus delphis*, *Tursiops truncatus*, and *Phocoena phocoena*. There are eight odontocete species in the Aegean and Mediterranean Seas (*D. delphis, T. truncatus, Stenella coeruleoalba, Globicephala melas, Grampus griseus, Pseudorca crassidens, Physeter catodon, Ziphius cavirostris*, and *Balaenoptera physalus*,

a *musticete* species). Overfishing, improper and unplanned development of coastal areas, sea pollution, and mass tourism are the most important threats to the survival of the sea mammals.

About 33 % of plant species in Turkey are endemic species. The rich flora of Turkey includes more than 9,000 plant species, of which 3,000 are endemic, and more than 500 bulbous plants. This flora, with a high endemism ratio, is also rich in medicinal and aromatic plants. This high level of endemism obligates Turkey to assume larger responsibilities in properly conserving the wild species, and protecting these species from the risk of extinction or extinction itself, bearing in mind that many of the cereals that a large portion of the world population depends on are derived from these wild species. It is now scientifically established that eight endemic plant species of Turkey became extinct in the 19th and 20th centuries due to human-induced factors (Ministry of Environment, 2001).

There are 472 fish species in Turkey and 50 of these are at risk of extinction. Some 192 freshwater fish species belonging to 26 different families have been identified in studies conducted to date. Located on the migration routes of many birds, Turkey is a key country for many bird species. There are approximately 454 known bird species and some of these species are globally under threat.

4.2.3. Ecosystems

4.2.3.1. Forest Ecosystems

The forests of Turkey can be classified into three types depending on the properties of their ecosystems: Humid forests, semi-arid forests, and forests at zones of transition from forested areas into steppes in the arid regions. Forests can be further classified by ecological region, to wit the Mediterranean, Eastern Black Sea, and Western Black Sea ecological regions. And by type of forest trees, forests can be classified into two types: Coniferous forests and deciduous forests. There are also forests with a mixture of these two types. Depending on the mixture, they may be referred to as pine, cedar, fir, beech, or oak-beech mixed forests.

While the mountain forests and alpine meadows with high endemism characterize the Eastern Black Sea Region, the Western Black Sea Region has deciduous forests of woody species. The world's largest natural cedar (*Cedrus libani*) forests, on the other hand, are located in the Taurus Mountains in the Mediterranean Region. These ecological region forests are considered to have high endemism ratios as they contain large numbers of endemic plant species. In the Aegean and Mediterranean Regions, there are humid, semi-humid, coniferous, and dry forests (oak, black pine, and red pine), besides the shrubs and maquis.

About 27% (20,763,248 ha) of the land area of Turkey is officially recognized as forestland. In the forest ecosystem of Turkey, degraded forests and coppice-land make up close to 52 % (10,735,680 ha) of the total forestlands of the country. The forests of Turkey are notably rich in terms particularly of biodiver-

sity, structural characteristics and types of forest trees. In these forests, 5 pine species, 4 fir species, 2 species each of beech, hazelnut, elm, hornbeam and ash, about 20 oak species, 10 maple species, 5 birch species, and numerous subspecies grow naturally.

Among the animals living in the forest ecosystem of Turkey are carnivorous mammals such as bears (*Ursus* species), foxes (*Vulpes* species), wolves (*Canis aureus*), Eurasian lynxes (*Lynx lynx*), and striped hyenas (*Hyaena hyaena*); other mammal species such as deer (*Cervus* and *Capriolus* species), Alpine chamois (*Rupicapra rupicapra*), wild goats (*Capra aegaprus aegaprus*), wild boars (S*us scrofa scrofa*); badgers (*Meles meles*), beech martens (*Martes foina*), hedgehogs (*Erinaceus species*), cape hares (*Lepus capensis*), weasels (*Mustela* species) and squirrels (*Sciurus* species); reptiles such as snakes, chameleons (*Chamaeleo chamaeleon*), lizards (*Lacerta* species) and turtles (*Testudo* species), and birds such as pheasants (*Phasianus colchicus*), Caspian snowcocks (*Tetraogallus caspius*), Caucasian black grouses (*Tetrao mlokosiewiczi*), woodpeckers (*Dendrocopus* species), predatory birds (*Aquila, Accipiter, Circus, Buteo, Pandion, Falco,* and *Pernis* species), various owl species, and numerous species of songbird.

Among the species mentioned above, the wild goat, the wild cat (*Felis silvestris*), the black vulture (*Aegypius monachus*), the imperial eagle (*Aquila heliaca*), the greater spotted eagle (*Aquila clanga*), and the lesser spotted eagle (*Aquila pomarina*) are forest fauna species now protected by international treaties (Ministry of Environment, 2001).

There are more than 8 million forest villagers living in 17,797 forest villages in Turkey. Studies show that between the years of 1937-1995, 200,000 ha of forestland (close to 1 % of total forests) have been cleared and converted into farmland, mostly through illegal ways and means, and 27,000 ha of forestland have been converted into settlement areas.

The customary agricultural and wood cutting and gathering practices of forest villagers are unsustainable and these practices are what fundamentally cause deforestation and soil erosion in the forestlands of Turkey. The consumption of wood as fuel was 12.2 million tons in Turkey in 1990. Of that, however, only 5.5 million tons were cut legally. The organizations responsible for the conservation and management of forests suffer from shortages of personnel and equipment, and some of their activities actually spoil natural resources. Only 72 % of forestlands have been registered on cadastre maps. Ownership rights are still unsettled on remaining lands. During the period 1950-1989, 1.4 million ha of land, officially considered as forestland, has been taken away from the authoritative power of the Ministry of Forestry. About 99% of forest fires in Turkey are caused by humans. The total forest area lost by fires was 1,398,198 ha as of 1991. This meant a loss of 28 ha per fire. As a result of measures taken over the last decade, this figure has been reduced to 2.5 ha per fire. Overgrazing, allowing goats to enter forestlands, atmospheric pollution, alien species, climate change, unregulated gathering of plant and animal species, hunting, damage caused by pests,

and forest fires all affect the structure of forest ecosystems and threaten biodiversity.

4.2.3.2. Steppe Ecosystems

It has been established that about 12,000 years ago, 70 % of the land area of Turkey was covered with forests and that the steppes were constricted to an area around the Lake Tuz (Ministry of Environment, 2001). As a result of accelerated destruction of forests, steppe flora gradually became dominant in Anatolia. During the last 50 years, on the other hand, due to human-induced problems, such as clearing land for agricultural activities, erroneous irrigation methods, and inappropriate land-use, a large section of steppe areas have also been irreversibly destroyed, and the remainder has degraded with overgrazing.

The meadows are an important component of the steppe ecosystem and they constitute 28 % (21,745,000 ha) of the land area of Turkey. This figure was 44,300,000 ha in 1935 and 37,800,000 ha in 1950. Meadows have been destroyed by policies that allowed these lands to be converted into farmland in order to meet the food demand of a growing population. Today, the total area covered by steppe ecosystems, which include meadows and marginal lands not suitable for agriculture, is 28,000,000 ha.

The steppe areas, sheltering many natural plant and animal species, are of vital importance from the perspective of biodiversity. These species greatly contribute to agriculture, the pharmaceutical, and other industries. Many of the cereals of today are derived from wild endemic species. As the great majority of cereals are derived from wild species unique to Turkey, steppes are probably the ecosystems with the most economic value (Ministry of Environment, 2001).

The steppe ecosystem of Turkey is home to many important species, such as the Anatolian mouflon (*Ovis orientalis anatolica*) which is an endemic sub-species, the wolf (*Canis spp.*), the Caucasian birch mouse (*Sicista caucasica*), the European mole (*Talpa europaea*), the European ground squirrel (*Citellus citellus*); the great bustard (*Otis tarda*) and the lesser kestrel (*Falco naumanni*), which are endangered bird species at the European scale; and the short-toed snake-eagle (*Circaetus gallicus*), hawks (*Buteo spp.*), falcons (*Falco spp.*), harriers (*Circus species*), the little bustard (*Tetrax tetrax*), the hoopoe (*Upupa epops*), and quail (*Coturnix spp.*).

The reasons for the destruction of steppe lands and their ecosystems in Anatolia can be listed as follows: High population growth over the last 50 years and consequent increase in levels of consumption, overgrazing in the absence of meadow management, conversion of meadows into agricultural lands, erroneous agricultural practices, unregulated hunting, stubble burning, pollution, increased soil erosion, highway and dam construction, excessive gathering of plants of high economic value (especially medicinal plants) using unsustainable methods, and improper mining activities.

4.2.3.3. Wetland Ecosystems

Interior waters cover 1.6 % of the land area of Turkey. The area of a total of

200 natural lakes is approximately 906,000 ha. The total area of artificial dam lakes, on the other hand, is 380,000 ha. The annual average of ground waters of the 26 water basins of Turkey is 186 billion m3. There are nine rivers with lengths of more than 500 km. Most of the rivers have highly fertile deltas and lagoons in the coastal areas where they flow into the seas. These deltas are of great importance for biodiversity, particularly the sea birds, and for the economy because of their fertile soil.

The wetlands, which cover an area of 1,851,000 ha in Turkey including the artificial lakes, provide crucial habitats for water birds and aquatic species. Some 58 out of a total of 250 wetlands of Turkey are designated as being of "international importance", and 18 of these wetlands have been acknowledged internationally as "A" class wetlands. Of the wetlands, 76 (1,240,000 ha) are identified as important bird sanctuaries.

Turkey's unique geographic location, on the flyways of migratory birds connecting Eastern Europe and Africa and surrounded by seas, makes it a main flyway for the bird species that migrate by flowing overland in the Western Palearctic. The bird migrations occur twice a year in spring and autumn and have different intensities depending on the migration calendars of the species. Birds spend winters in Africa or at latitudes with warm climates and come to Turkey or Europe for breeding. The three passageways where the flowing birds congregate during migration are located in Turkey (Strait of Istanbul, Artvin-Borçka mountain pass, and Hatay-Belen mountain pass). Many endangered bird species agglomerate at these passageways when migrating over Turkey. Among these species are the white stork (*Ciconia ciconia*), the black stork (*Ciconia nigra*), the Eurasian griffon (*Gyps fulvus*), the Egyptian vulture (*Neophron percnopterus*), the lesser spotted eagle (*Aquila pomarina*), the greater spotted eagle (*Aquila clanga*), the booted eagle (*Hieraaetus pennatus*), the short-toed snake-eagle (*Circaetus gallicus*), the black kite (*Milvus migrans*), the honey buzzard (*Pernis apivorus*), the buzzard (*Buteo buteo*), the Eurasian marsh-harrier (*Circus aeruginosus*), the Montagus harrier (*Circus pygargus*), the hen herrier (*Circus cyaneus*), the pale harrier (*Circus macrourus*), the Eurasian Sparrowhawk (*Accipiter nisus*), the Levant sparrowhawk (*Accipiter brevipes*), the peregrine falcon (*Falco peregrinus*), the Eurasian hobby (*Falco subbuteo*), the Dalmatian pelican (*Pelecanus crispus*), the white pelican (*Pelecanus onocrotalus*), the Eurasian spoonbill (*Platalea leucorodia*) and the crane (*Grus grus*).

During the autumn migration, the flowing birds such as storks, pelicans, and buzzard enter Turkey either from Kırklareli and Istanbul in the northwest or Artvin in the northeast. Some of the birds that enter Turkey from Artvin leave the country by a dispersed route shaped into a wide arc toward the south-southeast direction. Those who enter from the northwest, on the other hand, cross Anatolia diagonally toward the southeast and arrive at the Hatay province. These birds return during the spring migration, following almost the same migration routes. As there are a lot of life-threatening dangers during migration,

particularly for the endangered species of migratory birds, transit countries like Turkey are very important. At the Artvin-Borçka mountain pass, which is known more for predatory bird migration and particularly for the buzzard, more than 230,000 predatory birds were counted in 1976. The Hatay flyway is the main migration route where all the birds entering and exiting the country from the other two passageways congregate in springs and autumns. Studies conducted since 1998 by the Bird Research Society indicate that a total of 500,000 flowing migratory birds pass each year through the Belen mountain pass. A large majority of these species are storks (*Ciconia spp.*), eagles (*Aquila spp.*), and hawks (*Buteo spp.* and *Pernis apivorus*).

The wetlands of Turkey are being destroyed due to several human-induced factors, such as: Diversion of the courses of rivers and inappropriate irrigation projects; pollution from agricultural, industrial and residential waste; draining and rehabilitation activities to clear lands for agriculture and settlements; excessive and illegal fishing and hunting; illegal gathering of eggs and hatchlings of living creatures; unregulated cutting and burning of rush; establishing fisheries in the lagoons; sedimentation, absence of water management, and tourism. Currently, policy development studies are underway to identify policies for the use water of wetlands.

Turkey became a party to the *Ramsar Convention* in 1994 and accordingly the Lake Manyas, the Lake Burdur, the Lake Seyfe, the Göksu Delta, and Sultan Sazlığı were included in the list of the Convention. In 1998, with the inclusion in this list of Yumurtalık Lagoon, the Gediz Delta, the Kızılırmak Delta and the Lake Ulubat, the number of wetlands in the list of the *Convention* reached nine. Parallel to this, the Ministry of Environment has put into force the Regulation on *Conservation of Wetlands* intended to remove the threats to wetlands and to implement the *Ramsar Convention* at the national level. The Management Plans for Lakes Manyas and Ulubat have been prepared and put into effect.

4.2.3.4. Marine and Coastal Ecosystems

Turkey is encircled on its three sides by the Black Sea, the Mediterranean Sea, the Marmara, and the Aegean Sea, each with different ecological characteristics, and a total coastline of 8,333 km, excluding the islands. The Sea of Marmara displays the properties of an inland sea. The coastline of the Black Sea is 1,700 km, that of the Aegean Sea, excluding the islands, 2,805 km, and that of the Mediterranean Sea 1,577 km.

The Black Sea is the largest anoxic sea in the world and is the sea most isolated from oceans. Today, the Black Sea is under the threats of loss of habitats, overfishing, pollution caused by sea transportation and discharges from land, alien species, and eutrophication. The livelihoods of communities living by the Black Sea largely depend on fishing. Overfishing, however, has caused stocks of commercial fish species, such as turbot, anchovy, mackerel, tuna, and swordfish, to decline, and brought some species, such as the sturgeon, near to extinction. It is argued that out of a total of 26 species significant in terms of their commer-

cial value only 6 species remain.

The *Mnemiopsis leidyi*, an alien species, carried to the Black Sea from the North American shores of the Atlantic Ocean in ballast waters, and feeding on the eggs and larva of pelagic fish species such as anchovy, mackerel, and bonito, is only one of the important problems of the Black Sea. The extinction of other species of high commercial value caused by this species adversely affects the incomes and living standards of fishing communities. Extreme concentrations of pollutants, such as PCB and DDT, are found in harbor areas. Meanwhile, marine mammals are under threat because of the pollution of the Black Sea and by-catching. The endangered Mediterranean monk seal has almost become extinct in the Black Sea due to genetic isolation and destruction of habitats.

Land-based pollutants flow out mostly from the Danube River Basin and cause eutrophication and seasonal hypoxia. For instance, each year 111,000 tons of oil and oil composites flow into the Black Sea. 48% of this is carried by the Danube River alone. About 50,000 vessels enter the Black Sea annually, polluting the seawater with waste waters and oil spillages.

With their biological, geographic, meteorological, and hydrological characteristics, the Turkish Straits and the Sea of Marmara form a special ecosystem between the Mediterranean and the Black Sea. The conservation of this ecosystem is of vital importance for the conservation of the Mediterranean and the Black Sea. Sea transportation accidents, pollution, and exotic species are the most significant threats to this important sea ecosystem.

The Turkish straits are the waterways with the densest sea traffic in the world. Most of the accidents in the straits are caused by difficulties in navigation of vessels and tankers attributable to short sight and strong currents. In 1999, out of a total of 50,000 vessels crossing the straits 6,000 were tanker ships. With the continuous rise of this traffic, the dangers of accidents and environmental risks keep increasing. The increase in this traffic may also ship in many more alien species to the Black Sea in ballast waters. The human and environmental safety of the straits have been safeguarded by a statute since 1994, and all international rules pertaining to the prevention of environmental pollution during the transit of ships through the straits are diligently implemented. The Turkish Straits Sea Traffic Management and Information System Project, whose completion by the Undersecretariat of Maritime Affairs is expected by the end of this year, will be an important step forward in securing the safety of the straits.

The Aegean Sea is a part of the Mediterranean, and with its many islands, islets, and rock islands, it has a critical location in terms of ecosystem diversity. The Aegean Sea is very important for the endangered Mediterranean monk seal (*Monachus monachus*). Located in the transition zone between Europe and Anatolia, the Aegean Sea is also important for the conservation of the biodiversities of both Europe and Anatolia. The Aegean Sea and its islands contain numerous microhabitats (*Posidonia oceanica* and *Cystoseira* species) that play an impor-

tant role in the sustainability of the ecosystem. The plant and animal wealth of the Aegean Sea is under the threats of oil spillages, increases in the numbers of alien species, overfishing, and destruction of habitats. Settlements located in the coastal areas of the Aegean Sea do not have adequate infrastructures, and urban and industrial wastes pose a very serious threat to the Aegean ecosystem. In addition to this, the Aegean Sea, through its connection with the Mediterranean Sea and the Black Sea, is on the route of the oil tanker traffic, and is severely threatened by tanker accidents. The natural habitats of the Aegean Sea are being further destroyed by new settlements on the islands, coastal tourism developments that ignore the survival of ecosystems, and harbor and highway constructions.

It is estimated that along the coasts of Turkey, there are about 30,000-35,000 sea caves, all with very different geological formations, and harboring a great number of fish species and other sea creatures. These caves are shelters to many fish species and some of the caves are the habitats of the Mediterranean monk seals. Only 1,100 of these caves have been researched and mapped. These studies have shown that the caves are in deterioration. Legal arrangements need to be made and "conservation and utilization models" specified for the conservation of these caves and the organisms living therein (Ministry of Environment, 2002).

The still untouched coastal dunes and beaches on the Mediterranean coast of Turkey are of great importance as the breeding grounds of the endangered *Caretta caretta* and *Chelonia mydas* marine turtles. Parts of the dune systems that have not gone into degradation also harbor many endemic dune plants.

4.2.3.5. Mountain Ecosystems

Turkey is located on the mountain chain extending from the Alps to the Himalayas, and as such, close to half of its lands are in the mountain ecosystem. The extent and elevation of these mountains affect the evolution of different vegetation and forest zones. The mountain ecosystems play a large role in the relic and endemic plant diversity of Turkey.

4.2.4. Agricultural Biodiversity and Ecological Agriculture

It is hard to argue that there are integrated policies for conserving agricultural biodiversity in Turkey. A conceptual framework to be employed as the basis for policy formulation for agricultural biodiversity has not been yet developed. For instance, the *Eighth Five-Year Development Plan* does not make any mention of agricultural biodiversity.

The Parties to the CBD adopted a work program on agricultural biodiversity at the Fifth Conference of the Parties held in 1996 (Decision III/11). In 2000, another decision was passed to develop this program (Decision V/5), and at the Sixth Conference of the Parties meeting convened in The Hague on April 7-19, 2002, decision No. VI/5 was adopted. Turkey must take a number of steps in order to implement these decisions at the national level. The CBD, the *Agreement between the International Plant Genetic Resources Committee and the OECD Countries*

on Conservation and Exchange of Cereal Genetic Resources, and the CITES to each of which Turkey is a Party, need to be reflected in our national law, along with the recently adopted Biosafety Protocol which Turkey signed but to which it is not yet a Party, and the necessary legal arrangements need to be made.

4.2.4.1. Ecological Agriculture and Animal Husbandry

Ecological agriculture in Turkey first started in 1984 with the implementation of projects introduced by certain European companies. These companies contracted local farmers to grow the crops that they needed and imported these products back to their countries through the intermediation of Turkish exporters. Until the early 1990s, activities such as consultancy, supervision, and certification in ecological agriculture were performed by foreign organizations. Initially, ecological farming activities were restricted to the Aegean Region and to the production of dried figs and raisins, the two traditional export items of Turkey. Later on, ecological farming practices expanded to other regions to include other products such as dried apricots and hazelnuts.

According to the figures of the Ministry of Agriculture and Rural Affairs, an annual 168,306 tons of 92 different products are ecologically produced on 46,523 ha of land by 12,275 producers. In 1990, only 8 types of product were ecologically produced on 1,037 ha of land. Within nine years, these figures have risen to 92 and 46,523 ha, respectively. A large portion of products grown ecologically in Turkey is exported. For this reason, production levels and types of ecologically grown products depend on foreign demand. The dependency once again on foreign organizations in the analysis of chemical residues is another factor hindering the ecological agriculture sector from expanding nationwide.

There is no notable development in the production of ecological animal products in Turkey. Taking into account that the large population of Turkey necessitates much higher levels of production for domestic consumption, production systems for ecological animal products can be developed only through economic incentives.

Ecological agriculture and animal husbandry policies should not include methods of biological mitigation only. A structural transformation is required, whereby policies regarding conservation of biodiversity, agriculture, employment, farmers' and consumer rights, and the combating of poverty should be considered or approached as a whole. In this regard, the "Law pertaining to the Production of Agricultural Products Using Ecological Methods" should immediately be put into effect with the purpose of improving legislation in this regard and creating a legal basis for the existing regulation.

4.2.5. Biosafety

The use of biotechnology in the industrial sector is not very advanced at this time in Turkey. Nevertheless, considering its high levels of production and consumption of corn, wheat, soybeans, and other similar agricultural products, Turkey can be considered as an important market for "genetically modified organisms" (GMOs). There are serious gaps and associated problems in Turkey

and throughout the world in the political, legal, scientific, and technical aspects of importation and cultivation of transgenic plants and the sale of food products obtained from these plants in the domestic market.

Potential risks associated with the use of modern biotechnology and foods produced using this method endanger not only human health, but also natural resources embodying biological diversity. Accordingly, the priority action should be to implement biosafety policies and practices for biotechnology safety and to integrate them into agricultural, environmental, and technological policies. Furthermore, we need to be aware of the fact that an oversight of the potential risks of GMOs which allegedly increase agricultural production and help reduce the use of herbicides, pesticides, and artificial fertilizers, may cause irreversible environmental impact in the mid and long terms.

Both in economic terms and in terms of biodiversity, there are potential risks to existing species in Turkey associated with the entry, production, and expansion of transgenic species. The fact that these risks have not been scientifically researched yet further increases the dimensions of potential threats.

Moreover, Turkey is under a more special threat in terms of the long term impact of transgenic plants on plant sociology, genetic diversity of natural species, species distribution in the ecosystem, and the ecological equilibrium. This threat, which may cause a total annihilation of the existing gene resources, is very significant for biodiversity in Turkey, where the gene resources of a large number of wild plants are harbored. In addition to this, the documents and forms used by the Ministry of Agriculture and Rural Affairs to control the safety of imported raw or processed plant products, are not designed to check on the GMO content of these imports. This means that there is no information on their importation. It has been argued, however, that products containing GMOs may have entered Turkey, as these products are marketed mixed with other products not containing GMOs.

Concurrent to this, it is known that transgenic plants have been the subject of field experiments in Turkey since 1998. When these field experiments are concluded, it is expected that the transgenic plants will be certified, produced, and used in the food chain. However, these experimental studies have been criticized on the grounds that they are being conducted in the absence of institutional and technical infrastructures, that their R&D basis is extremely insufficient, and that there is no legislation to regulate these activities.

Turkey signed the *Biosafety Protocol*, which was prepared within the framework of CBD, on 24 May 2000. However, it is not yet ratified and Turkey still suffers from the lack of a legal framework regarding the safety of biotechnology.

4.2.6. Threats to Biodiversity

The threats to the rich biodiversity of Turkey may be summarized as follows:

• The economic pressures of high population growth in rural areas and the disintegration of agricultural lands due to the gaps in legislation cause the incomes of farmers to decline. This situation compels small farmers to engage in

activities that threaten biodiversity, such as cutting forests to clear land, causing damage to pastures by overgrazing, and excessive gathering of plants. Unsustainable forestry policies and implementations also have adverse effects on biodiversity.

• Unsustainable agricultural methods, the destruction of pastures in order to obtain fertile agricultural lands, and stubble burning are the most significant threats to biodiversity of the steppe areas.

• About 5.1 million ha of cultivated land are classified as 5th and 6th class by soil quality. A large portion of this land has been acquired by clearing forests and pastures. Unregulated and excessive grazing continues to damage fragile steppe ecosystems and put economic pressure on rural communities whose livelihood depends on animal husbandry.

• Some 460,000 ha of fertile agricultural lands have vanished due to the shortcomings of legislation regulating land-use development and the new physical development at urban fringes. Urban fringe areas are rapidly filled with unregulated and unplanned residential and industrial developments, augmented further by migrations from rural areas. Natural habitats just vanish under these conditions.

• Land speculation and the booming of the summer home market in coastal areas, particularly in the Aegean and Mediterranean Regions, pose another important problem. The ineffectiveness of the institutional arrangements to prevent environmental deterioration, and shortcomings in legislation, result in loss of habitats which is the most important threat to biodiversity. The destruction of coastal habitats causes the extinction of many land and marine animal and plant species.

• Excessive and inappropriate fishing, capturing and hunting of wild animals, and insufficient regulation and monitoring of the collection of medicinal plants, grasses, and tubers threaten the survival of many species. Meanwhile the inadequacy of control mechanisms to regulate the time spans and seasonal duration of fishing in the interior waters and the seas threatens the biodiversity of seas and freshwaters. One of the most important threats to biodiversity is the illegal and excessive hunting of many bird species and especially of large mammals such as wolves (*Canis lupus*), brown bears (*Ursus arctos*), Eurasian lynxes (*Lynx lynx*) (the hunting of which is prohibited by the Ministry of Forestry) and wild goats (*Capra aegagrus*) (the hunting of which is restricted by the same ministry).

• Overgrazing, allowing goats to enter forests, atmospheric pollution, climate change, alien species, unregulated gathering of plant and animal species, hunting, damage caused by pests, forest fires and loss of forest property by illegal clearing of forestlands are the chief threats to forests, along with unresolved problems of ownership.

• The incentives provided to the agricultural sector without paying attention to environmental consequences have resulted in heavy use of chemical agents and fertilizers, and the implementation of erroneous irrigation projects. With

the expansion of intensive and irrigated agriculture in Turkey, the adverse impact on biodiversity and human health of chemical agents and fertilizers, the use of which is at present relatively low, is expected to increase in the future.

• The salinization of agricultural lands due to erroneous irrigation practices also causes loss of biodiversity. Coastal, marine, and wetland ecosystems are severely affected by industrial and agricultural pollution, and by residential wastes.

• In the mass tourism projects which have been subsidized, and received incentives, from the 1980s onwards, the environmental concerns were limited to the development of infrastructure. These developments have caused difficult-to-compensate or irreparable destruction of the natural habitats of living creatures particularly on the Mediterranean coasts (the breeding grounds of marine turtles, the habitats of the Mediterranean monk seals, etc.), dunes, lagoons, coastal forests, and fertile agricultural lands. In this regard, unsustainable hunting, fishing, and gathering methods, and the cutting of forests to clear land in order to meet the demands of the tourism sector, unregulated discharge of residential waste into the seas, and seasonal variations of population pose serious problems for the conservation of biodiversity and habitats.

• Another significant problem is the scarcity of specialists and technical staff in environmental protection programs in Turkey. Timing and experience factors, which are very important for biodiversity conservation, are affected by appointments and retirements when government changes hands. It is especially difficult to recruit experienced and qualified technical staff in rural areas and protected areas, where biodiversity is of much more concern. The selection and recruitment of specialists without paying attention to balancing the distribution of professional backgrounds may also heighten the risks of a one-sided approach.

• GMOs and alien species cause losses in biodiversity and have adverse effects on genetic diversity in particular.

• Other threats to biodiversity are droughts and soil erosion.

4.3. Steps Taken to Conserve Biodiversity (1992-2002)

Over the last decade, a large number of concrete steps have been taken for the conservation of biodiversity. These actions and activities are summarized under sub-headings in Table 4.1.

Table 4.1
Steps Taken to Conserve Biodiversity (1992-2002)*

International Commitments	• Efforts to adapt to EU legislation played a role in evaluating the situation. Capacity-building activities were conducted in this process. • Turkey participated in the Pan-European Process on Protection of the Forests and ensured national coordination of the Strasbourg, Helsinki, and Lisbon decisions. • The European Landscape Convention was signed. • Turkey became a Party to the Convention on Biological Diversity, and a National Coordination Unit was established. • Signed the Cartagena Protocol on Biosafety. • Signed the POP's Convention. • Turkey became a Party to the CITES Convention. • Turkey become a Party to the Convention to Combat Desertification and established a National Coordination Unit. The National Action Plan to Combat Desertification is being drafted, with completion planned by the end of 2002. • Turkey became a Party to the Ramsar Convention. • Turkey became a Party to the Convention on the Protection of the Black Sea against Pollution. • Turkey became a Party to the Basel Convention on the Control of the Transborder Movements of Hazardous Waste and Their Disposal
Institutional/ Regulative Actions	• CITES Regulation passed. • Exportation Circular issued by Undersecretary of Foreign Trade in accordance with the CITES Regulation. Importation Circular presented to relevant organizations for input. • The Wetlands Regulation passed. • The Pastures Law passed. • Undersecretariat of Maritime Affairs founded.
Strategy Preparations	• National Environment Strategy and Action Plan (NEAP) prepared. • National Biodiversity Strategy and Action Plan prepared. • National Action Plan to Combat Desertification is being prepared. • Action Plan prepared for In-situ Conservation of Plant Genetic Diversity in Turkey. • *National Agenda 21* Document completed in a participatory process.
Implementations	• The area of the Special Environmental Protection Regions increased by 58 % with the designation of new regions. • The number of protected areas designated in accordance with Law on National Parks increased. 12 new National Parks (343,288 ha), 58 Natural Monuments (452.05 ha), 9 Nature Parks (57,211 ha), and 12 Nature Conservation Areas (28,850 ha) were designated. • Long-term development plans are being prepared for protected areas designated as National Parks. 10 plans completed. • Following the signing of the *Ramsar Convention*, 9 Ramsar Sites were designated. • Black Sea National Action Plan (GEF) prepared and Black Sea Commission established. • Ecological rehabilitation of the Black Sea begun (GEF). • The Flora Database of Turkey prepared. • Institutional capacity building, awareness raising, and participatory activities continued. • NGOs conducted activities concerning ecological farming and consump tion of ecological products

	• Number of biodiversity projects assisted by GEF/SGP reached 60. • Number of activities for the conservation of endangered/threatened species increased. • Number of participatory projects for public awareness raising increased. • New course programs developed by Ministry of National Education putting more emphasis on the environment in general and biodiversity in particular.
Ongoing Activities	National Forestry Program (TCP/TUR/0066(A)) preparations, National Biosafety Legislation Development Project, Mediterranean Strategic Action Plan (SAP-MED), Biodiversity Database Project of Turkey, Law on Organic Agriculture draft.

* Implementation projects are taken up under a separate heading and are, therefore, not included in this table.

4.3.1. Species Conservation

4.3.1.1.Conservation of Marine Turtles

Conservation efforts started in 1988 on the 17 chief breeding grounds of marine turtles, which were identified through detailed research studies, and, under the provisions of international conventions, are carried on today by the World Wildlife Foundation (WWF), the Turkish Society for the Conservation of Nature (DHKD), and Dokuz Eylül University. Turkey has accepted the Action Plan (1989 and 1999) for the conservation of Mediterranean marine turtles within the framework of the *Barcelona Convention*. These 17 chief breeding grounds have been at the same time designated as Natural Preservation Sites since 1992, and some of these breeding beaches have been indicated on the Environmental Development Plans of the Ministry of Public Works and Settlement.

Furthermore, the Authority for Specially Protected Areas carries out monitoring studies on a regular basis in order to protect the habitats of marine turtles in the Specially Protected Areas of Patara, Belek and Iztuzu SPA.

The Ministry of Environment has established the Marine Turtles National Commission and Marine Turtles Scientific Commission and since 1993 has been conducting individual monitoring programs at 17 important breeding grounds.

The efforts of the NGOs to conserve the marine turtles and their habitats are commendable. The projects conducted by the DHKD, with the financial support of the WWF and other international organizations include important components such as management planning, public participation, awareness raising, educational programs in schools, research, and situation assessment. The Management Plan encompassing the Çıralı breeding beach was prepared by the DHKD in 2000 and received the Best Practice Award in Dubai in 2000.

4.3.1.2. Conservation of the Mediterranean Monk Seal: Foça and Yalıkavak Pilot Sites

Turkey accepted the action plan for the conservation of the Mediterranean monk seals developed in the framework of the *Barcelona Convention* in 1989. For

the implementation of this plan, a Mediterranean Monk Seal National Committee was established under the coordination of the Ministry of Environment and with the participation of relevant institutions and organization.

Due to a conflict of definitions of power between the two ministries, the Ministry of Public Works and Settlement has not marked the habitats of these seals or the conservation plan conditions on its Environmental Development Plans, as was requested by the Ministry of Environment. The issue has been unresolved since 2000.

The activities of the Underwater Research Society-Mediterranean Seal Research Group (SAD-AFAG) exemplify a best practice for how the specialized NGOs can contribute to species conservation in Turkey. The SAD-AFAG played important roles in the establishment of the National Seal Committee and in the preparation of the *National Seal Conservation Strategy* in 1992. The activities of the SAD-AFAG became more effective when the Group secured the cooperation of the municipality and the fishermen of Foça in 1991, established the Foça Local Seal Committee, succeeded in having Foça selected as a "Pilot Site" for Mediterranean monk seal conservation, and launched the "Foça Pilot Project", Turkey's first long-term marine conservation project, with the financial support of the WWF. In 2000, the Karaburun Peninsula was also included among the permanent study areas of the SAD-AFAG. From its project offices in Aydıncık, Karaburun, and Foça, the teams of SAD-AFAG conduct research, public awareness building, and planning-conservation activities in close cooperation with local governments and local communities.

4.3.1.3. Conservation of other Species

A large portion of species conservation activities in Turkey is conducted by the Ministry of Forestry (General Directorate of National Parks and Game, Wildlife) and the Ministry of Environment.

Wild Goat (*Capra aegagrus*): Field studies were initiated, albeit with very limited resources, in a number of provinces in 2001 to research the distribution of wild goats. Due to the shortage of experienced and qualified staff at both the main offices and the provincial branch offices, this study is limited to a simple inventory, and the development and implementation of a conservation plan for this species has been further postponed.

Mouflon (*Ovis gmelinii anatolica*): The history of the conservation of this species goes back to the mid-1960s (1966: The designation of 42,000 ha of land in Konya Bozdağ as a Wildlife Conservation Site). However, these activities were limited to academic research. Similarly, over the last decade, academic and site-specific research have been conducted on the Alpine chamois (*Rupicapra rupicapra*), the great deer, the red deer (*Cervus elaphus*), and the wild boar (*Sus scrofa*), but without any progress made in conservation.

Eurasian Otter (*Lutra lutra*): Regarding this species, there are only individual efforts supported by the International Otter Survival Fund (IOSF). In addition,

the Turkish Society for the Conservation of Nature declared the year 2000 to be "otter year", prepared a booklet, and organized an otter symposium.

Bursa-Karacabey Brown Bear (*Ursus arctos*) Sanctuary: The World Society for the Protection of Animals (WSPA), as part of their World Liberty Campaign, conducted activities to ban the use of brown bears as dancers in Turkey, Bulgaria, and Greece, and to assemble and rehabilitate these abused animals. The sanctuary created for this purpose soon turned into a site where about 50 bears are kept, with a few more individuals being added each year. Currently, the sanctuary is run in the context of the cooperation agreement reached between the General Directorate of National Parks and Game, Wildlife and the Pro-Animalia Organization.

It is known that up until the early 1st century BC the Asian elephant (*Elephas maximus asurus*) lived near the lakes and wetlands of Kahramanmaraş and Hatay and in the valleys of the Euphrates and Tigris Rivers. Likewise, in the same era the wild ox (*Bos primigenius boganus*) lived in different regions of Anatolia, and the wild ass (*Equus hemionus anatoliensis*) lived near the Euphrates and Karasu up until the end of the 12th century. The lion (*Panthera leo persica*) was last seen in the second half of the 19th century near Birecik in the Euphrates Valley. The cheetah (*Acinonyx jubatus*) lived in Southeastern Anatolia up until the 19th century. According to one entry in the records, a tiger (*Panthera tigris virgata*) was hunted for the last time in 1970 in Southeastern Anatolia. The bald ibis (*Geronticus eremita*), on the other hand, is not able to survive in nature by itself anymore, and only a few individuals have remained in a conservation area in Birecik.

Black Vulture (*Aegypius monachus*)

The black vulture is the largest predatory bird of Europe and is classified as "nearly threatened" by the IUCN all over the world. The black vulture breeds in dispersed colonies. There are 190 pairs in Caucasia, 20 pairs in Greece, 1,000 pairs in Spain, 6 pairs in Ukraine, and an estimated 50-200 pairs in Turkey. The Bird Research Society conducts activities for the conservation of the Kızılcahamam population of this species.

The great bustard (*Otis tarda*), which is classified as "vulnerable" among endangered species both in Turkey and the world, naturally prefers the prairie ecosystem. However, agricultural lands and pastures of Europe have been transformed into settlement areas on a continental scale. It is estimated that the world population of the great bustard is around 33,709-39,433, and the population in Turkey is around 800-3,000. The Bird Research Society also conducts activities for the conservation of the great bustard.

Apart from the extinct species, the numbers of some mammal species such as the red deer (*Cervus elaphus maral*), the roe deer (*Capreolus capreolus capreolus*), the fallow deer (*Cervus dama*), the wild sheep (*Ovis ammon anatolica*), and the goitred gazelle (*Gazella subgutturosa*) are diminishing, and these species are considered to be threatened.

For its accomplishments in the Konya-Bozdağı Anatolian Wild Sheep Protected Area, the Ministry of Forestry General Directorate of National Parks and Game, Wildlife has won the Edmond Blanc Award, given each year for the best conserved protected areas by the International Council for Game and Wildlife Conservation (CIC).

4.3.2. Area Conservation

Concerning the conservation of areas rich in biodiversity in Turkey, both *in-situ* and *ex-situ* conservation programs and projects are realized by the public sector, as well as the NGOs. *In-situ* conservation areas include national parks, nature conservation areas, nature parks, wildlife conservation areas, special environmental protection regions, natural sites, natural endowments, and gene conservation and management areas. *Ex-situ* conservation programs and projects are run at seed and collection gardens, arboretums, botanic gardens, and gene banks.

In-situ Conservation

Efforts to conserve species in their natural habitats were started in the 1950s, even before the *in-situ* conservation concept was widely acknowledged. The information on *in-situ* conservation areas, as provided by the relevant organizations, is summarized in Table 4.2

Table 4.2
In-situ Conservation Areas in Turkey

Protected Areas	Responsible Organization	No	Area (ha)
National Parks	Ministry of Forestry	33	686,631
Nature Parks	Ministry of Forestry	16	69,137
Nature Conservation Areas	Ministry of Forestry	35	84,229
Natural Monuments	Ministry of Forestry	59	462
Wildlife Conservation Areas	Ministry of Forestry	107	1,671,199
Breeding Stations	Ministry of Forestry	41	5,491
Conservation Forests	Ministry of Forestry	53	365,884
Gene Conservation Forests	Ministry of Forestry	163	23,408
Seed Stands	Ministry of Forestry	344	46,348
Type A Recreation Areas in Forests	Ministry of Forestry	52	2,208
Type B Recreation Areas in Forests	Ministry of Forestry	198	8,245
Specially Protected Areas	Ministry of Environment	13	1,069,000
Ramsar Sites	Ministries of Environment & Forestry	9	159,300
Natural Preservation Sites	Ministry of Culture	750	..
Natural Endowments	Ministry of Culture	2,370	
TOTAL		4,243	

The General Directorate of Forests and the General Directorate of National Parks and Game, Wildlife are responsible for the protected areas administered by the Ministry of Forestry.

With its 250 wetlands on more than 1 million ha of land, Turkey has the most wetland resources and biodiversity of any country in Europe. The number

of Ramsar Sites under the responsibility of the Ministry of Environment has increased to 9, with a total area of 159,300 ha. The Ministry of Environment has been conducting Management Planning and ecological-biological research in these areas since 1992.

There are 13 designated Specially Protected Areas (SPAs), which are administered by the Authority for Specially Protected Areas of the Ministry of Environment. These SPAs cover an area of 1,069,000 ha (1,3 % of the total land area of Turkey) and are of great importance for biodiversity.

To date, 750 different Natural Preservation Sites have been registered and protected by the Ministry of Culture. These natural sites rich in biodiversity are defined as "real properties and lands that must be preserved as they are rare natural assets with fascinating characteristics and beauty".

The *Environmental Performance Review*: Turkey states that the "protected areas make up only 3.9 % of the total land area of the country" (OECD, 1999: 25). Another source, however, declares that protected areas account for 4.83 % (Yurdakul, 2000: 63).

Ex-situ Conservation

Ex-situ conservation is realized through the establishment of collection gardens, gene banks, seed banks, zoos, and botanical gardens, and through measures to sustain these establishments over long periods of time. Unlike the *in-situ* conservation, in *ex-situ* conservation genetic resources are conserved under controlled conditions.

Systematic and continuous project-based activities for the conservation of genetic resources of plants started with the establishment of the "Plant Research and Introduction Center" in Menemen, Izmir, by the Ministry of Agriculture and Rural Affairs in 1963.

This center conducts systematic activities and studies concerning the genetic resources of plants, such as quarantining after entry, entry certification, storage, and study of the seed physiology of cereals, fodder plants, leguminous plants, vegetables, industrial plants, ornamental plants, aromatic and medicinal plants, fruits and endemic plant species.

The genetic resource materials of plants collected since 1964 are stored at the national Gene Bank established in 1972 as part of the Aegean Agricultural Research Institute in Izmir. A total of about 50,000 genetic resource materials from all plant varieties are protected at this Bank in Izmir. The Ankara Field Crops Central Research Institute Gene Bank, on the other hand, has under its protection about 6,000 genetic resource materials of cereals, leguminous plants, fodder plants, and some endemic plants.

4.3.3. Policies

The main policies regarding the biodiversity of Turkey are contained essentially in the development plans which, according to the *Constitution*, are binding for the public sector and guiding for the private sector. The *NEAP*, which was developed in a participatory process, is the only adopted and published strate-

gic policy document directly relating to the subject of environment. The *National Biodiversity Strategy and Plan of Action, National Agenda 21, National Action Plan to Combat Desertification* (draft), on the other hand, although not published and adopted as documents of official policy, are nevertheless important documents, prepared in accordance with the international commitments of Turkey, to guide national policies and actions in conserving biodiversity.

4.3.4. Development Plans

4.3.4.1. The Five-Year Development Plan Periods during 1991-2002

The environmental policies developed for the conservation of biodiversity have been included in five-year development plans to varying extents. The *Sixth Five Year Development Plan* stated for the first time that all policies and strategies concerning all sectors should adapt an environmental perspective. But the *Sixth Five Year Development Plan* failed to specify any special targets for the conservation and the sustainable use of biodiversity. The *Seventh Five Year Development Plan* was the first plan to make clear statements about sustainable development and natural resource management. The *Eighth Five Year Development Plan,* which is still under implementation, goes a step further to state that "it is essential in economic and social development to protect human health, ecological equilibrium, and historical and aesthetic assets". The Plan also makes provisions regarding the promotion of the sustainable use of natural resources and the minimization of environmental risks. Finally, the Plan also includes provisions regarding the minimization of biosafety risks that may arise from the practices of the biotechnology sector, and calls for an integrated approach to undertake the necessary legal, institutional, and implementation arrangements in this regard.

While the subject of the environment is taken up as a separate sector in five-year development plans, it is also included at differing magnitudes and degrees in the chapters on other sectors, chiefly in chapters on the agricultural and forestry sectors. It is in the *Eighth Five Year Development Plan* that the subjects of sustainable development, biodiversity, natural resource management, and conservation have been emphasized most clearly and comprehensively (SPO, 2001).

4.3.4.2. National Environment Strategy and Action Plan (NEAP)

In its own wording, the NEAP proposes "concrete actions to synthesize economic development with the issues of the environment". The Plan was prepared using an approach which is highly parallel to the *Eighth Five Year Development Plan*. The *NEAP* is also one of the milestones of the *National Agenda 21,* and as a politically sanctioned policy document it is of great importance for steering the actions of today and tomorrow.

4.3.5. Strategies

The strategic studies mentioned below, although not yet completed and politically sanctioned, are important policy documents intended to guide the efforts for the fulfillment of the international commitments of Turkey.

4.3.5.1. National Biodiversity Strategy and Plan of Action

The *National Biodiversity Strategy and Plan of Action (NBDSPA)*, prepared after

the ratification of the *CBD*, is an essential guide for the implementation of the *CBD* in Turkey, for the efforts to fulfil the commitments emanating from other national and international legislation, and for the attunement of actions for the conservation and sustainable use of biodiversity. The Strategy aims at establishing a framework for the conservation and the sustainability of biodiversity and biological continuity.

Priority actions for the implementation of the Strategy are defined as follows:

- To make legal and institutional arrangements for the conservation of biodiversity,
- To prepare management plans for the conservation of endemic and endangered plant and animal species and their natural habitats,
- To provide education to all segments of society on the concepts and principles of nature conservation in order to attain the goals of conservation and sustainable use of natural resources,
- To raise the awareness of local communities by cooperating with the users of protected areas.

4.3.5.2. National Action Plan to Combat Desertification (draft)

The *UN Convention to Combat Desertification (UNCCD)* is of importance for Turkey, which because of its climate conditions is less affected by droughts than other parts of the world, but where semi-arid conditions nevertheless prevail in a large section of its land area. Land erosion is one of the most important environmental problems, affecting to a varying extent 86 % of the land area of the country, and each year 1 billion tons of soil are lost due to soil erosion. Plans call for the completion by the end of 2002 of the *National Action Plan to Combat Desertification*, which is one of the most important commitments of Turkey regarding the *UNCCD*, to which Turkey is a Party. The Plan is designed to identify measures for the reduction of the effects of drought and the factors causing desertification.

4.3.5.3. National Agenda 21

One of the most important steps taken after the 1992 Rio Summit in terms of fulfilling national commitments was the preparation and the approval of the *National Agenda 21*. The importance of the *National Agenda 21* lies in its open assertion that environmental problems are not independent of social and economic activities and must be tackled in conjunction with development policies.

4.3.5.4. National Forestry Program

The *National Forestry Program*, currently being prepared by the Ministry of Forestry, is designed to develop a sustainable forestry program. Within the context of the National Forestry Program Preparation Project the following activities are currently being conducted: Forest planning and management, forestry institutions, marketing of forest products and the forest industry, forest legislation, forest-village relations, participatory forestry, and the project for the "Formulation, Analysis, and Appraisal of Alternative Scenarios for the

Development of the Forestry Sector".

4.3.6. Legal and Institutional Structures

The Constitution, together with various laws, regulations, and international conventions regarding nature conservation, make up the legal framework for the conservation and sustainability of biodiversity in Turkey.

The *Environment Law* (2872) empowers the Ministry of Environment to prepare legislation and other related legal instruments, to secure the national level coordination of implementations of international conventions on environmental protection and the activities of other institutions and organizations regarding environmental protection, and as necessary, to take steps to halt unlawful activities. The Ministry of Environment is responsible for the entire coordination of international conventions on conservation and nature protection. Moreover, as a requirement of legislation, "Environmental Impact Assessment" (EIA) reports must be prepared for a large number of investment projects. The Ministry of Environment, together with other related ministries, holds the powers and the responsibility of coordinating the EIA process.

The Authority for Specially Protected Areas (ASPA) attached to the Ministry of Environment, on the other hand, is responsible for the protection, planning, and management of 13 SPAs which harbor natural and historical endowments in different regions of Turkey. The principles and methods to be used for the protection, rehabilitation and physical development of the environment in the SPAs are decided on by the ASPAs. At the local level, the governor's offices are in charge of attending to and regulating the SPAs.

One-fourth of Turkey's land area is forestland, under the care and responsibility of the Ministry of Forestry. The General Directorate of Forest and Village Relations conducts projects regarding forest villages. This Ministry is the main organization responsible for the identification, planning, conservation, and management of protected areas, which are designated as such in accordance with the *National Parks Law* and *Terrestrial Hunting Law*. The General Directorate of National Parks and Game, Wildlife of the Ministry of Forestry is empowered to and responsible for identifying the species to be conserved, managing wildlife, making the legal arrangements regarding the management of wildlife, issuing hunting licenses and regulating hunting according to the *Terrestrial Hunting Law*. The General Directorate controls hunting activities through the National Hunting Commission composed of central and local units of the Ministry, and associations for hunting and marksmanship. Fishing activities, on the other hand, are under the responsibility of the Ministry of Agriculture and Rural Affairs (MARA). The MARA has the powers and responsibilities for the use and coordination of all natural resources related to agriculture, including pastures. For the meadows and pastures inside the forestlands, however, the Ministry of Forestry is responsible. The MARA is also empowered to regulate the use of agricultural herbicides and pesticides and chemical fertilizers.

The Ministry of Culture is responsible for the protection and management of

natural preservation sites designated as such in accordance with the *Law Governing Preservation of Cultural and Natural Assets*. The Ministry is empowered to designate and preserve the natural, historical, archeological, and urban sites in order to hand down these natural and cultural endowments to future generations. The Ministry performs its duty of preserving the immovable cultural and natural endowments through the High Committee of Preservation of Cultural and Natural Heritage and the local Committees of Preservation of Cultural and Natural Heritage, which are all coordinated by the General Directorate of Cultural and Natural Heritage.

The multi-faceted institutional structure summarized above necessitates the harmonization of different conservation statuses of the same protected areas, and at the same time, the prevention of repetitive and conflicting activities.

The legislation regarding the conservation and sustainable use of biodiversity is very extensive, and in some regards dispersed:

The *National Parks Law* (No. 2873) aims at establishing regulative principles for the selection and designation of protected areas, for their conservation without essential change, and for their improvement and management.

The *Law Governing Preservation of Cultural and Natural Assets* (No. 2863) provides definitions of movable and immovable cultural and natural endowments to be preserved, and specifies powers and responsibilities regarding the designation of protected areas, decisions about their management, approval of development plans for preservation, and deleting from the registers immovable properties which have lost their heritage value.

In the context of the *Convention on the Conservation of European Wildlife and Natural Habitats* (Bern), to which Turkey is a Party, an ecological network called the "Emerald Network" is being established. Because of Turkey's unique geographical location, there are numerous types of natural habitats which are not mentioned in the annexes of the *European Union Natural Habitat and Bird Directives*. For this reason, these habitats need to be identified in a detailed study to be conducted during the process of adapting to the EU, so that legislation can be reciprocally adjusted.

Turkey signed the *Ramsar Convention* in 1994 and designated nine Ramsar areas in accordance with this Convention. Studies indicate that 56 of the wetlands are of "international importance" by international standards.

Turkey signed the *CITES Convention,* prepared and enacted the *CITES Regulation*, and issued pertinent circulars.

The MARA has put into force varied legislation on biodiversity and biosafety in the aftermath of Rio 1992. In 1998, the *Directive Regarding Field Experiments on Transgenic Cultivated Plants* was enacted. Efforts have been completed to incorporate the issue of the certification of transgenic plants into the *Regulation on the Certification of Plant Varieties*. It was suggested that the Regulation be amended in order to forestall any risks that might potentially arise from the ongoing field experiments. Pending the accomplishment of this aim, a change has been

made in the Directive (1999) to fill the gap.

By becoming a Party to the CBD and ratifying it as part of the national law, and by signing the *Biosafety Protocol* prepared on the basis of Articles 19/3, 19/4, 8(g) and 17 of the Convention, Turkey has shown that it agrees in principle with the policies shared by the international community.

Other legislation in force is: *Animal Rehabilitation Law* (2001), *Regulation on the Collection, Preservation, and Use of Plant Genetic Resources* (1992), *Regulation on the Production of Plant and Animal Products Using Ecological Methods* (1994), *Regulation Amending Certain Articles of the Regulation on the Production of Plant and Animal Products Using Ecological Methods* (1995), *Regulation on the Collection, Production, and Exportation of Natural Flower Bulbs* (1995), and *Regulation on the Conservation of Animal Genetic Resources* (2002).

4.3.7. Research

Research studies on biodiversity are being conducted in Turkey by a large number of institutions/organizations, the universities, and the Scientific and Technical Research Council of Turkey (TUBITAK). Many public institutions and organizations conduct research and monitoring programs regarding biodiversity through their research institutions. A few NGOs also conduct research on biodiversity. The first plant database of Turkey, developed by the TUBITAK and dubbed the "Turkish Plants Main Database" (TURKHERB), was expanded in 1997 to include 97,000 plant samples derived from 23 different plant collections. Work on this database continues. A "Fauna Database of Turkey" is currently being prepared and includes information on vertebrate and invertebrate species.

4.3.8. Education, Participation, and Capacity Building

One of the four objectives of the *NEAP* is environmental awareness building. The *NEAP* was followed by the preparations of the *National Action Plan on Environmental Education, Awareness and Communication* conducted under the coordination of the Ministry of Environment. The hunter education program of the Ministry of Forestry and farmer education, and public awareness programs of the MARA, continue in the context of several implementation projects.

Environmental education activities are predominantly conducted by the NGOs. The numbers of local NGOs have increased in recent years. These NGOs prioritize and emphasize environmental education in general, and the conservation of biodiversity in particular. The NGOs have also helped in explaining the importance of biodiversity to the public, bringing the issues of conservation of biodiversity into the public agenda, and influencing the actions of the public sector in this regard.

During the last five years especially, implementation projects, and particularly projects conducted with international financing, have often emphasized the issue of capacity building. In this regard, the programs run by the UNDP-GEF/SGP to build capacity within the NGO sector engaged in the field of environment and biodiversity are noteworthy. These programs aim at capacity build-

ing in project development, fund raising, project implementation, monitoring and assessment, and at reaching out to and building the capacity of local NGOs in different regions of Turkey through the intermediation of national NGOs. Not only do these programs increase the success of the GEF/SGP projects, they also contribute to the advancement of the NGOs in their own fields.

The integration of conservation and sustainable use of biodiversity with all aspects of life is only possible through the participation of individuals and all stakeholders in the process of making decisions regarding the conservation and use of biodiversity, decisions that have a large impact, present and future, on our lives. While there are no legal barriers preventing people from participating in conservation issues in Turkey, there are also no legal provisions and public attitudes that encourage participation in its wider sense. Participation is limited to information sharing, both in the EIA process and in other aspects of environmental protection.

4.3.9. Projects for the Assessment and Conservation of Biodiversity

Table 4.3
Principal Ongoing Projects with Foreign Financing and/or Government & Foreign Financing

In-situ Conservation of Species Diversity Genetic Diversity	• *In-situ* Conservation of Gene Resources Project (GEF-I) • Plant Biodiversity and Conservation Project • *In-situ* Conservation and Management of Threatened Plant Species in Their Ecosystems Project • Project for Researching Options for *in-situ* Conservation (at the farmer level) of Genetic Diversity of Transition Zones
Ecosystem – Area	• Lake Manyas Ecological Risk Analysis and Management Plan Project • Management of National Parks and Protected Areas, Conservation of Biodiversity, and Rural Development Project • Biodiversity and Natural Resource Management Project (GEF-II) • Conservation of Wetlands Projects • SAP-BIO Project • Research on Caulerpa Species in the Mediterranean Project • Southeastern Anatolia Region Biodiversity Research Project
Biosafety	• Biosafety Research and Development Project
Organic Farming	• Organic Farming Project
Projects readied for implementation, preparations completed, and budgets financed	• Kaz Mountains Eco-Tourism Project • Sustainable Management of National Parks with a Participatory Approach Project • Küre Mountains GEF Project

4.3.10. International Programs

4.3.10.1. Mediterranean Action Plan (MAP)

The *Mediterranean Action Plan* was launched by the coastal countries of the

Mediterranean and the European Economic Community in 1975 and was improved and expanded by a joint decision in 1995. The *Action Plan for the Protection of the Marine Environment and Sustainable Development of the Coastal Region of the Mediterranean* is currently implemented by 20 coastal countries and the European Union. With its new structure, this Plan is one of the most important international programs in the conservation of marine and coastal biodiversity at regional, national, and local levels. The *Protocol Concerning Specially Protected Areas and Biological Diversity in the Mediterranean,* which became effective in 1999 and has replaced the former *Protocol Concerning Specially Protected Areas* (1995), to which Turkey was a Party, is probably the most significant legal document on the subject. Turkey should ratify this Protocol, which it signed in 1995, as soon as possible in order to effectuate regional and national activities in this regard (Algan, 1998).

4.3.10.2. Black Sea Environmental Program (GEF - BSEP)

The *Convention on the Protection of the Black Sea against Pollution,* which was signed in 1992 and became effective in 1994, the protocols attached to this Convention, and the *Odessa Declaration,* which was signed at the ministerial level, constitute the legal framework of regional cooperation for the conservation of the Black Sea. Based on this framework, the *Black Sea Environment Program* was launched in 1993 with the support provided by the Global Environmental Facility (GEF). The EU and some other countries have also provided support to the Program. In the context of the GEF-BSEP, a Project Coordination Unit was established in Istanbul. This Unit is designed to serve the secretariat to be established in the administrative structure of the Istanbul Commission, which is already an acting body, after a certain period of time when, according to the *Bucharest Convention,* the latter will found its own coordination unit. Regional activities are currently conducted under the *Black Sea Strategic Action Plan.* The Plan is intended to restore the natural ecosystems of the Black Sea and to ensure the sustainable and rational use of its natural resources.

4.3.10.3. UNDP-GEF/SGP (Small Grants Program of GEF)

The GEF/SGP was initiated in Turkey in 1993. Turkey was one of the first countries contributing to the development of country-specific and locally managed program implementations. The GEF/SGP extends financial assistance to the NGOs, particularly to local NGOs, and contributes to providing solutions to global environmental problems by assisting the local level activities of these organizations. As such, the Program is unique and effective as a new approach. It also contributes greatly to capacity building for the NGO sector, to facilitate public participation.

During the pilot implementation period (1993-1995) 20 projects were assisted by the GEF/SGP. During the next phase, the first period (1996-1998), 10 more projects received assistance. The second implementation period started in 1999, which is still in effect, and 14 and 10 more projects were approved for GEF/SGP assistance in the second and third years of this period, respectively,

and 5 other projects received project preparation assistance. During the pilot and first periods of the GEF/SGP, the NGOs received financial assistance for projects dealing with climate change, biodiversity, international waters (the focal points of the GEF) and for other projects on soil erosion and degradation, which are issues related to the focal points. Starting with the second implementation period, the GEF/SGP projects concentrated more on biodiversity and international waters, and soil erosion and degradation. There is a close relationship between the *Local Agenda 21s* and the GEF/SGP projects.

4.3.11. Non-Governmental Organizations

The NGOs functioning at the national level can be labeled "national NGOs" and the others, functioning at the local level of a certain area or region, can be labeled "local NGOs". The capacity of the NGO movement has considerably increased over the last decade and the NGOs working on biodiversity have made very significant contributions to informing the public and the private sector about the challenges.

The Association for Conservation of Nature of Turkey (ACNT) and the Turkish Society for the Conservation of Nature (DHKD) are two NGOs working on biodiversity. The NGOs such as the Foundation for the Protection and Promotion of the Environmental and Cultural Heritage, the Rural Environment and Forestry Association, and the Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats (TEMA) work predominantly on forests and sustainable development. The Turkish Marine Environment Protection Association and the Turkish Marine Research Foundation (TUDAV) work on issues related to the seas. The Environment Foundation of Turkey, on the other hand, works on environmental policies and law. The increase in the number of these NGOs and the deepening of the specialties of the NGOs such as the Bird Research Society and Underwater Research Society-Mediterranean Seal Research Group (SAD-AFAG), which specialize in species protection, are indicators of a very positive development whereby the tasks in the large field of conservation of biodiversity are shared.

4.3.12. Evaluation

Apart from physical and ecological conditions, economic and social factors also have a determining effect on biodiversity. Each year, the annual loss of 20,000 ha of forests results in soil erosion. About 80 % of coastal dunes have vanished thanks to physical development. During the last 30 years, 60% of wetlands and a great portion of meadows and pastures have been destroyed by agricultural activities spurred by ignorance. Only 12% of the forests are in the old forest category. Air, water, and soil pollution, energy consumption, solid/liquid wastes, excessive and erroneous use of chemical agents and fertilizers in agriculture, and excessive and illegal fishing continue to pose huge problems.

In Turkey, the conservation of threatened species and endemic species are more emphasized and publicized than the conservation of biodiversity itself. Turkey is rapidly losing its self-sufficiency in producing its own foodstuffs, par-

ticularly cereals and meat products. This indicates that the critical importance of the conservation and improvement of biological and genetic resources for the food and health sectors has not been adequately understood. Only 33.13 % of total arable lands are used in agriculture and cultivated, and 2.91% of lands not cultivated are arable (SIS, 2001). On the one hand, Turkey is rapidly losing its agricultural lands, meadows, and pastures because of incorrect land-use practices, and on the other hand, its lands and meadows are becoming degraded due to the increase in soil erosion and use of chemical agents and fertilizers. Another important impediment is the formulation of national agricultural policies according to the agreements reached with the IMF, which do not permit the introduction of methods for sustainable use of biodiversity.

Turkey has undergone a remarkable transformation in the management and planning particularly of protected areas over the past decade. The experiences of the last five years have led us to clearly understand that designation of protected areas based on legislation alone is not good enough; these areas need to be rehabilitated with different methods and means to conserve the biodiversity and natural habitats they contain, and successful results are hard to achieve without the participation of communities living in the protected areas or in their vicinity.

However, that the public sector and NGOs accept the participatory and holistic management planning approaches in the conservation of protected areas and natural habitats rich in biodiversity is in itself not satisfactory. This approach needs to be reinforced with new legal arrangements to improve the existing legislation.

The universities are conducting a considerable amount of scientific studies on the identification of species and genetic diversity. Nevertheless, the position of conservation of biodiversity in the agendas of universities is not much different from its position in the public agenda. The inadequacy of financial resources allotted for this purpose adversely affects the numbers, pace, and, quality of studies that principally need to be conducted on location.

There are specialized NGOs that work primarily on the conservation of biodiversity. They are a very significant asset of Turkey in its efforts to achieve the goals of conserving biodiversity. Albeit problematic and inadequate at times, partnerships formed with the NGOs in conservation activities are increasing and expanding.

With their different objectives and contexts, the Environment Law, the National Parks Law, and the Law Governing the Preservation of Cultural and Natural Assets play important roles in the conservation and management of biodiversity. Nevertheless, from the point of view of the sustainable and integrated management of biodiversity, the disarray of different laws and regulations in environmental protection legislation and the uncertainties in institutional distribution of duties may cause overlapping and/or conflicting implementations in environmental protection and natural resource management. Biodiversity, the

ecosystem approach, and sustainability are relevantly new concepts and approaches whose contemporary descriptions and content are not incorporated in existing legislation.

Moreover, international conventions are superimposed on the existing situation without making the necessary adjustments in legislation, and as a consequence there is more confusion. The fact that national legislation has not been adequately adjusted in line with the international conventions also causes conflicts in implementation.

There are three main types of protected areas in Turkey and they are administered by the Ministries of Culture, Forestry, and Environment. Some areas have more than one conservation status, thereby causing conflicts of powers and responsibilities among organizations. In addition to this, the Ministry of Environment is responsible for designating Ramsar Sites, but it is not empowered to protect these areas. This discrepancy needs to be corrected as soon as possible.

The evaluations made by the participating institutions and organizations during the preparatory consultations of the *National Report* indicate that they have acquired significant experience during the last decade. In this period, a better and deeper appreciation of the following issues was realized: The permanency of human resources, particularly the efficient employment of experienced personnel; the contribution to the effectiveness of public projects of integrating environmental and conservation concerns; the importance of institutional capacity building; the necessity of inter-organizational cooperation. Experience has also showed that projects based on the cooperation of the public sector and the NGOs are more effective. Other important issues on which more knowledge has been acquired through the experience of the past decade are: The realization that conservation activities which do not secure the active participation of the public have little or no chance of producing effective or positive results; the fact that conservation requires the formulation of those solutions which conform with local, socio-economic, and cultural realities; and active participation, capacity building and the importance of awareness raising in all sections of society.

5.4. Towards the Future

5.4.1. Proposals

The proposals that came out at the working sessions of the preparatory process of the *National Report* are grouped under the headings of policy development, legal and institutional arrangements, implementation mechanisms, and technical and administrative methods, and are provided below. They were formulated with the participation of all relevant institutions and organizations with the aim of guiding our future.

PROPOSAL AREAS	PROPOSALS
POLICY FORMULATION	• Conservation and sustainable use of biodiversity should be integrated into all national sectoral plans and programs. • Traditional utilization methods that contribute to the conservation of biodiversity should be supported and improved. • National policies should be developed regarding genetically modified organisms (GMOs) and alien species as factors threatening biodiversity. • Eco-tourism should be promoted. • Clean technologies should be promoted in the industrial sector and incentives should be provided for the industry to adopt measures for environmental protection. • Fields of cooperation with the NGOs should be expanded and developed. • Conservation policies should be developed. • All decisions about the use of all ecosystems should be free of political influence.
LEGAL/ INSTITUTIONAL ARRANGEMENTS	• Legislation should be developed for the conservation of biodiversity in areas remaining outside the protected areas. • The Soil Law should be put into effect and implemented. • The Biosafety Law should be put into effect and a National Biosafety Committee should be established. • A Nature Protection Law should be prepared. • Landscape conservation areas should be included in relevant legislation as a sepa rate category. • The Law on National Deforestation and the Control of Soil Erosion should be implemented. • The 2b-practice should be stopped in forest areas. • The articles of the Tourism Incentives Law concerning the use of coastal and forest areas that are irrespective of the sustainability of ecosystems should be amended in line with the principles of sustainable development and conservation of biodiversity. • National legislation should be adapted to the following EU directives: Council Directive 90/220/EEC on the Deliberate Release into the Environment of Genetically Modified Organisms; Council Directive 90/219/EEC on the Contained Use of Genetically Modified Microorganisms; Regulation (EC) No 258/97 of the European Parliament and of the Council concerning Novel Foods and Novel Food Ingredients. • The EIA process should prioritize the prevention of loss of biodiversity; the required legal arrangements should be made for the transition into the Strategic EIA process. • Powers and responsibilities of public institutions and organizations should be clearly defined to prevent overlaps and conflicts, and inter-organizational cooperation and coordination should be effectuated. • Protected areas should be locally managed using a participatory approach. • Dissuasive measures should be taken to prevent the illegal entry and exit of species specified in national legislation and international conventions to which Turkey is a Party. • Organic farming practices should be expanded, protected, and supported. • Studies concerning the economic use of gene resources should be speeded up. • Studies concerning the economic utilization of biodiversity should be prioritized.
IMPLEMENTATION MECHANISMS (PROTECTED AREAS, MANAGEMENT PLANNING, INVENTORY, INDICATORS, MONITORING PROGRAMS, FINANCIAL MECHANISMS)	• The numbers of protected areas should be increased to cover at least 5 % of the land area of the country and they should be more effectively managed. • Financial resources allotted to conservation of biodiversity should be increased. • Research institutes should expand their projects geared towards solving the problems of implementation and these efforts should be supported. • The areas which are of significance and require priority action in terms of biodiversity (areas where rare, endemic, and endangered species are found) should be identified and designated for in-situ conservation. • Biodiversity and sustainable development indicators should be developed. • Action should be taken to accelerate the completion of inventories. • The communities living in protected areas should be supported with the

PROPOSAL AREAS	PROPOSALS
	introduction of alternative means for their livelihoods. • Protected areas should be managed at the local level using a participatory approach. • Fund raising, planning and project implementation activities should be undertaken to revive the damaged/degraded ecosystems. • Action should be taken for the improvement and a more expanded use of native species. • Land-use should be decided on at the level of each basin according to management plans. • Clean technologies should be promoted for the industrial sector, and incentives should be provided for the industry to take environmental protection measures. • Dominant or indicator species in ecosystems should be identified at the level of each basin and monitored. • Steppe ecosystems should be protected. • Sustainable and alternative methods/approaches should be developed for the species gathered from nature, and traditional information and experiences should be compiled and protected. • Action should be taken to protect the genetic diversity of cultivated species, to tightly control access to these species, and to retain the information, benefits, and new results emerging from their use within the country. • Action should be taken to make situation assessments, establish a data bank, and improve data management models. • An information exchange mechanism should be established. • Funds allocated for investments in the conservation of biodiversity should be increased. • Adequately sized areas, which are significant in terms of biodiversity, should be reserved for the conservation of each ecosystem. • Land-use plans should be prepared at the national scale. • Organic farming practices should be expanded, protected, and supported. • Studies concerning the economic use of gene resources should be speeded up. • Studies concerning the economic utilization of biodiversity should be prioritized. • A natural history museum should be established.
CAPACITY BUILDING	• The infrastructure of customs offices should be improved and adequate numbers of customs specialists should be trained and employed. • In a restructuring process, institutional organization and capacities should be enhanced with human resources development, infrastructure, technical assistance, etc. for the purposes of conservation of biodiversity. • The capacities of NGOs should be enhanced with the support of international programs.
AWARENESS BUILDING/ EDUCATION	• Means of communication should more effectively be used for awareness raising. • In-service training programs should be conducted for the training of personnel at all institutions/organizations who have responsibilities and powers in biodiversity and its sustainable management. • Awareness building programs should be implemented for different target groups, particularly geared towards people living in protected areas and those who use these areas. • Education programs should be prepared for primary education and higher education in biodiversity.