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The Republic of Turkey

THE STUDY ON THE REGIONAL DEVELOPMENT PLAN FOR THE EASTERN BLACK SEA REGION IN THE REPUBLIC OF TURKEY (DOKAP)

Final Report

Volume V Environment

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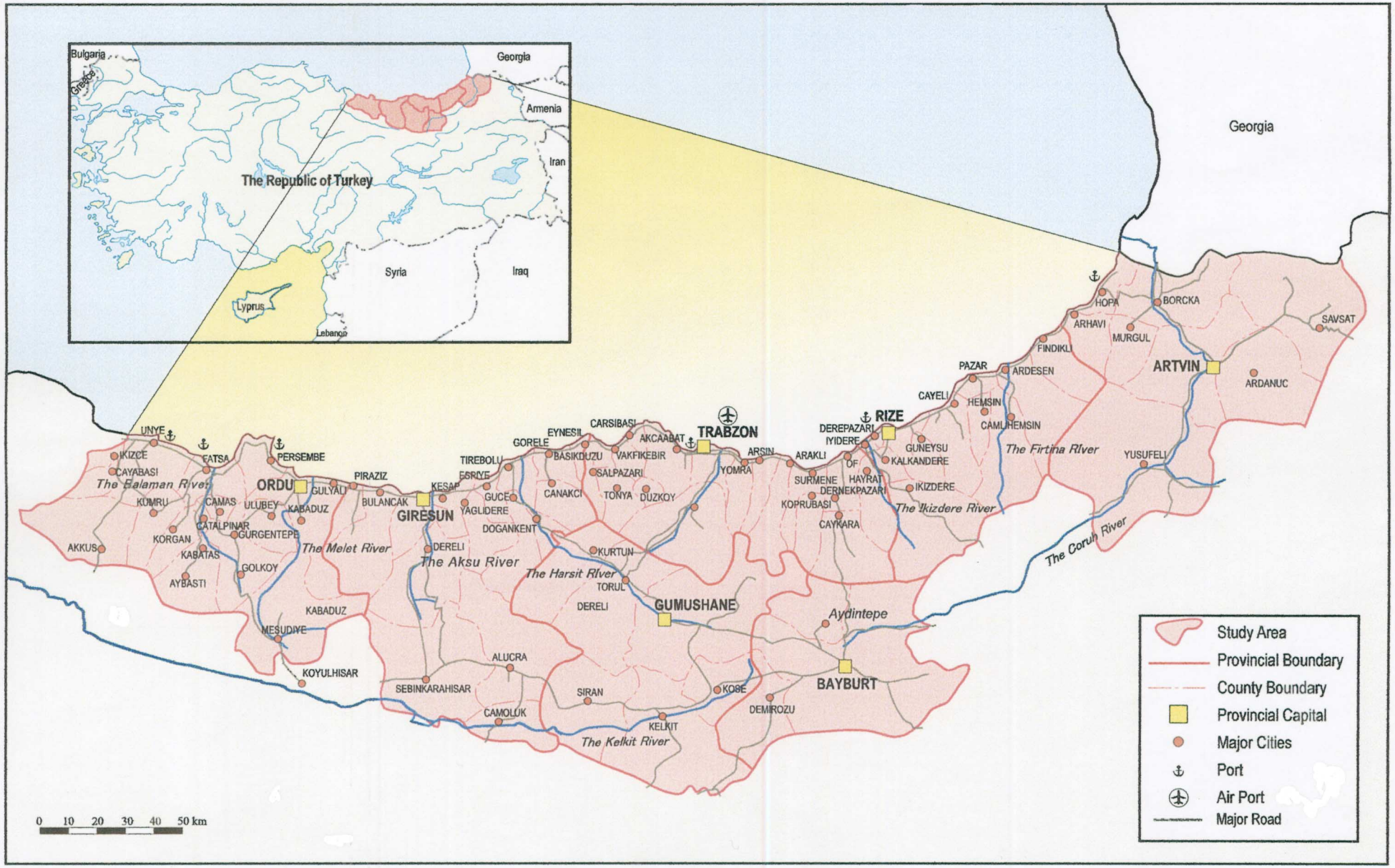

Location Map

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ABBREVIATIONS

AGM	General Directorate of Afforestation and Erosion Control (Agaçlandirma ve Erozyon Kontrolu Genel Müdürlügü)
ASOR	International convention on the harmonization of frontier controls acceding to the convention.
BECC	Black Sea Economic Cooperation Council
BOD	Biological Oxygen Demand
BOO	Build, own and operate
BOP	Bank of Provinces
BOT	Build, operate and transfer
BOTAS	Petroleum Pipelines Corporation (Boru Hatlari ile Petrol Tasima A.S)
BSEC	Black Sea Economic Cooperation
BSEAP	Black Sea Environmental Action Plan
CDA	County directorates of agriculture
CI	Corporate Identity
CIS	Commonwealth of Independent States
CMR	Convention on the contract for the international carriage of goods by road
COTIF	Convention Concerning International Carriage by Rail
CS	Customers Satisfaction
DHKD	Society for the Protection of Nature (Dogal Hayati Koruma Derneg)
DOKAP	Eastern Blacksea Regional Development Plan (Dogu Karadeniz Bölgesel Gelisme Plani)
DSI	General Directorate of State Water Works (Devlet Su Isleri Genel Mud.)
EIA	Environmental impact assessment
EIE	Electrical Power Resources Survey and Development Administration
EIEI	Electric Survey Administration (Elektrik Isleri Etüt Idaresi)
FAO	Food and Agriculture Organization of U.N.
FCCC	UN Framework Convention on Climate Change
FCRI	Field Crop Research Institute
FIRR	Financial Internal Rate of Return
FISKOBIRLIK	Association for Hazelnut Marketing Cooperatives (Findik Tarim Satis Kooperatifleri Birligi)
FTSII	Forest Trees and Seed Improvement Institute
GAP	Southeastern Anatolia Project (Güneydogu Anadolu Pro.)
GATT	General Agreement on Trade and Tariffs
GDAR	General Directorate of Agricultural Research (Tarimsal Arastirmalar Genel Müdürlügü)
GDNPGW	General Directorate of National Parks, Game and Wildlife
GDP	Gross domestic product
GDRS	General Directorate of Rural Services (Köy Hizmetleri Genel Mudurlugu)
GDVA	General Directorate of Village Affairs

GEF	Global Environmental Facility
GIS	Geographic information system
GPS	Global Positioning System
GNP	Gross national product
GOT	Government of Turkey
GPRA	Government Performance and Results Act
GRDP	Gross regional domestic product
GSM	Global system for mobile communications
GVA	Gross value added
IFAD	International Fund for Agricultural Development
IGEME	Export Development Center (Ihracati Gelistirme Etud Merkezi)
IIBK	Institute for Finding Jobs and Workers
ILLER Bankasi	Bank of Province
IRR	Internal rate of return
ISP	Internet service providers
IT	Information Technology
ITB	International Tourismus – Boerse
IUCN	World Conservation Union
JICA	Japan International Cooperation Agency
KGM	General Directorate of State Highways (Karayollari Genel Mudurlugu)
KOSGEB	Small and Medium Size Enterprises Development Organization (Kucuk ve Orta Olcekli Sanayileri Gelistirme ve Destekleme Idaresi Baskanligi)
KÖK	Association for Protection of Characteristics of Blacksea (Karadenizin Ozelliklerini Koruma Dernegi Klübü)
KÖYKOBIRLIK	Union of Village Cooperatives
KTÜ	Blacksea Technical University (Karadeniz Teknik Universitesi)
MARA	Ministry of Agriculture and Rural Affairs (Tarim ve Köy Isleri Bakanligi)
M&E	Monitoring and evaluation
MENR	Ministry of Energy and Natural Resources (Enerji ve Tabii Kaynaklar Bakanligi)
METU	Middle East Technical University
MOC	Ministry of Culture
MOF	Ministry of Forestry (Orman Bakanligi)
MONE	Ministry of Natural Education
MOT	Ministry of Tourism (Turizm Bakanligi)
MPGM	General Directorate of National Parks and Wildlife (Milli Parklar ve Av-Yaban Hayati Genel Mudurlugu)
MTA	Mineral Research Institute (Maden Tetkik Arama)
NARS	National agricultural research system
NGO	Non governmental organization
NPR	National Performance Review
OECD	Organization for Economic Cooperation and Development
OGM	General Directorate of Forestry (Orman Genel Mudurlugu)

OIZ	Organized industrial zones (Organize Sanayi Bolgeleri)
ORKOY	Forest Village Relations General Directorate (Orman ve Koy iliskileri Genel Mudurlugu)
OSCE	Organisation for Security and Co-operation in Europe
PDA	Provincial Directorate of Agriculture
PGRRI	Plant Genetic Resources Research Institute
PMU	Project Management Unit
PPA	Power purchase agreement
PTT	Mail Telephone Telegraph General Directorate (Posta Isletmeleri Genel Mudurlugu)
PVC	Polyvinyl Chloride
RIC	The convention concerning the international transport of goods by rail
RIV	The international convention to facilitate the crossing of frontiers for goods carried by rail
SEKA	Government Paper Corporation
SFYP	Seventh Five-year Development Plan
SID	Small Industry Districts (Kucuk Sanayi Siteleri)
SIS	State Institute of Statistics (Devlet Istatistik Enstitusu)
SME	Small and medium enterprise
SMI	Small and medium industry
SPO	State Planning Organization (Devlet Planlama Teskilati)
SSK	Social Security Agency (Sosyal Sigortalar Kurumu)
STOL	Short Take-off and Landing
TCDD	General Directorate of State Railways (Turkiye Cumhuriyeti Devlet Demiryollari)
TCZB	Agricultural Bank of Turkey (Turkiye Cumhuriyeti Ziraat Bankasi)
TDI	Turkish Maritime Company (Turkiye Denizcilik Isletmesi)
TEDAS	Turkish Power Distribution Company (Turkiye Elektrik Dagitim Anonim Sirketi)
TEAS	Turkish Power Generation and Transmission Company (Turkiye Elektrik Uretim Iletim Anonim Sirketi)
TESK	Union of Associations of Artisans and Trarders
TIR	Transports Internationaux Routiers
TKK	Agricultural Credit Cooperatives (Tarim Kredi Kooperatifleri)
TODAIE	Institute of Public Administration for Turkey and the Middle East (Turkiye ve Ortadogu Amme Idaresi Enstitusu)
TOE	Ton of oil equivalent
TPAO	Turkish Petroleum Corporation (Turk Petrolleri Anonim Ortakligi)
TQM	Total Quality Management
TTGV	Technology Development Foundation of Turkey (Turkiye Teknoloji Gelistirme Vakfi)
TTK	Turkish Hard Coal Enterprise (Turkiye Taskomuru Kurumu)
TÜBİTAK	Turkish Scientific and Technical Researches Council (Turkiye Bilimsel ve Teknik Arastirmalar Kurumu)

TÜPRAS	Turkish Petroleum Refineries Corporation (Turkiye Petrol Rafineleri AnonimSirketi)
TÜSÌAD	Association of Turkish Industrialists and Businessmen (Turkiye Sanayiciler ve Isadamlari Dernegi)
TV	Training and visit system
USAID	U.S. Agency for International Development
VAT	Value added tax
VGT	Village group technicians
WTO	World Trade Organization
YIBO	Regional primary education boarding schools (Yatili Ilkogretim Bolge Okullar

Abbreviation of Measures

Extent

cm^2 = Square-centimeters
m^2 = Square-meters
km^2 = Square-kilometers
ha. = Hectares (10,000 m^2)

Volume

cm^3 = Cubic-centimeters
m^3 = Cubic-meters
l = Liter

Length

mm = Millimeters
cm = Centimeters (cm = 10 mm)
m = Meters (m = 100 cm)
km = Kilometers (km = 1,000 m)

Weight

g. = Grams
kg = Kilograms
ton = Metric tonne
DWT = dead weight ton

Energy

kcal = Kilocalories
TOE = Tons of oil equivalent
kW = Kilowatt
MW = Megawatt
kWh = Kilowatt-hour
MWh = Megawatt-hour
GWh = Gigawatt-hour

Others

% = Percent
^0C = Degree Celsius

CHAPTER 1 EXISTING CONDITIONS OF DOKAP REGION

1.1 Natural Conditions

1.1.1 Geography

Turkey forms a natural bridge between the continents of Asia, Africa and Europe. In particular, the Country occupies a unique geographical position at the crossroads between Central Asia and Middle East.

Turkey lies within the geologically young folded-mountain zone of Eurasia, which extends predominantly east to west. Its topographic structure shows the Country's high elevation in comparison to its neighbors, about one-fourth of the surface having an elevation above 1,200 m, and less than two-fifths lies below 500 m. Mountain crests exceed 2,000 m in many places, particularly in the east, where Turkey's highest mountain, Mount Ararat (Agri) reaches 5,137 m close to the borders with Armenia and Iran. Steep slopes are common throughout the Country, while flat or gently sloping land makes up barely one-sixth of the total area.

Four main geographic regions can be identified: the northern folded zone, the southern folded zone, the central massif, and the Arabian platform. The northern folded zone comprises a series of mountain ridges, increasing in elevation toward the east, that occupy a belt about 140 to 200 km wide immediately south of the Black Sea. The system as a whole, for which there is no single Turkish name, is referred to as the Anadolu Daglari.

The geology of Turkey is complex, with sedimentary rocks ranging from Paleozoic to Quaternary, numerous intrusions, and extensive areas of volcanic materials. Most of the rock is basic igneous but many of the jagged high peaks are of granite (Davis 1965). There are also outcrops of cyanite[1] and granodiorite[2] in the Kaçkar Range; these are rock types rarely found in Turkey. The mountains

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[1] Cyanite, also kyanite, mineral aluminum silicate (Al_2SiO_5), found in long, triclinic, blade-shaped crystals. Cyanite has a glassy or pearly luster and is usually blue. It has a sp.gr. of about 3.6, and its hardness varies from 4 to 7, depending on the direction in which the crystal is scratched. The mineral has been used as a gem but is most commonly mined as a material for porcelains to be used at high temperatures, as in spark plugs. Cyanite is mined in North Carolina and Georgia and also in France, Switzerland (where the best gem-quality stones are obtained), and Austria.

2 Granodiorite is an intermediate colored, medium to coarse-grained intrusive rock. It falls between granite and quartz diorite, containing more dark minerals than granite but less than quartz diorite. The light colored minerals are quartz and feldspar; the feldspar is a mixture of orthoclase and plagioclase. The dark colored crystals are hornblende and/or biotite.

show signs of fairly extensive past glaciations and there are still some small glaciers on the highest peaks of the Kaçker Mountains.

The DOKAP region comprises the provinces of Artvin, Bayburt, Giresun, Gumushane, Ordu, Rize, and Trabzon in northeastern Turkey, between latitudes 39°50' and 41°32'N and longitudes 36°42' and 42°37'E. The seven provinces have combined area of 39,361 km^2 (Artvin -7,436 km^2, Giresun -6,965 km^2, Gimushane -6,748 km^2, Ordu -6,142 km^2, Rize -3,920 km^2, Trabzon -4,498 km^2, and Bayburt -3,652 km^2), which is 5.04% of area of the Country.

All except Gimushane and Bayburt are bordered to the north by the Black Sea (Kara Deniz) coast. The border with the Republic of Georgia forms the eastern boundary. It exhibits great diversity in geological structure, topography, climate and vegetation cover.

1.1.2 Mountains

Within the DOKAP region, high mountain ranges run parallel to the Black Sea coast in the north with undulating plateau on the southern foot of the mountains. High ridges trending east-west rise abruptly from the Black Sea coast, and the coastal plain is thus narrow, opening out at only a few places. Kizilirmak and Yesilirmak rivers break through a mountain barrier in a zone where summits are below 600 m, dividing the Anadolu Daglari into western and eastern sections. The mountain range gets higher, narrower, and steeper toward the eastern area. Less than 75 km from the coast, the Dogu Karadeniz mountains rise to more than 3,700m, with a maximum elevation of 3,937 m in the Kaçkar range, one of the steepest topography in the world.

The ranges of the Giresun and the Karadeniz mountains (the eastern portion of the Anadolu Daglari) have many peaks of over 3,000m and reach their highest point at Mt. Kaçkar (3,932m), southeast of Çamlihemsin in Rize. Other important mountain ranges include Mt. Yalnizçam, southeast of Artvin (with a number of peaks between 2,413m- 3,050m), Mt. Alaca and Mt. Savval (both above Murgul in Artvin) and Mt. Soganli (3,193m-3,353m), which forms the boundary between the Northeast Anatolia and the East Anatolian high plateau. The region is connected to the high plateau, and thus to the rest of mainland Asia, by a few high passes (geçidi). The most important of these are the Zigana Geçidi, the Ovitdagi Geçidi and the Suruca Geçidi. Silk merchants and other travelers from the Far East have used these for centuries.

The Dogu Karadeniz mountains are separated by the narrow trough of the Kelkit and Çoruh river valleys from a second ridge that rises above 2,400 m. The Kaçkar mountain (3,932m) is the highest point in the northeastern section of the Anatolian mountain chain. The mountains rise between the shores of the Black Sea to the north and the Çoruh river valley to the south. Extensive glacier and water erosion have given these mountains their craggy, rugged look, and they are known for the complexity and power of the streams and rivers, which rush down to the lower altitudes. The Kaçkar mountain range is one of three most important glacial regions in Turkey following the Agri (Ararat) and Cilo-Sat mountains. Beside the geological interests of the mountain, Kaçkars contribute to tourism and economy of the country.

1.1.3 Black Sea

The Black Sea is an inland sea, lying between southeastern Europe and Asia Minor. The Bosphorus, the Sea of Marmara, and the Dardanelles connect the Black Sea with the Aegean Sea. Romania, Bulgaria, and the European portion of Turkey bound it on the west. Ukraine, Russia, and Georgia border the northern and eastern shores; the entire southern shore is Turkish territory.

Navigation in the Black Sea began early. Many of the colonial and commercial activities of ancient Greece and Rome, and in later times of the Byzantine Empire, centered on it.

The catchment area of the Black Sea includes major parts of seventeen countries and the second, third, and fourth largest rivers in Europe, respectively the Danube, Dnieper, and Don rivers. A large part of central and eastern Europe is drained through the Dnepr, Dnestr, Southern Bug, and Danube. The drainage from a considerable section of eastern European Russia is received through the Don River (which flows into the Sea of Azov). The western Caucasus region drains through the Kuban (which also flows into the Sea of Azov), and a number of smaller rivers. Finally the Black Sea watersheds and a part of northern Asia Minor of Turkey drains through the Çoruh, Yesilirmak, Kizilirmak, and Sakarya rivers.

Figure 1.1 Black Sea and Neighboring Countries

The Black Sea has a length of about 1,200 km from east to west, a maximum width of 610 km, and an area (excluding its northern arm, the Sea of Azov) of about 436,400 km^2 and it is a semi-inland sea. The Crimean Peninsula projects into the Black Sea from the north, forming the shallow Sea of Azov on the east and the Karkinitskiy Gulf on the west. The former is almost entirely cut off from the Black Sea. Total water volume is 536,969 km^3, 87% of which is deep water without oxygen.

The water catchment basin is 2.2 million km^2. The average depth is 1,272 m, with 37% of the sea floor deeper than 2,000 m. The floor of its single central basin lies about 1,830 m below the surface, and the greatest depth exceeds 2,135 m. The shallow sections (less than 200 m) are to the north and west and constitute 27% of the water area.

Average salinity is 0.18-0.19%, increasing below 100 m and reaching 0.22% around 200 m. Surface water temperature varies from 21-24 °C in summer and from 12-13 °C in winter. In the northwest tip, it falls to 2 °C in the winter. The sea has a surplus of surface waters because of high precipitation, limited evaporation and the abundance of continental fresh water inflows. This leads to an annual average outflow of surface water into the Sea of Marmara of 612 km^3. However, the sea also receives a 312 km^3 average annual inflow of saline water from the Mediterranean through the counter current along the Bosphorus. The

prevailing winter winds are from the north. Severe storms occur frequently on the sea, particularly during the winter season.

1.1.4 Rivers and lakes

The principal watersheds in the DOKAP region are Çoruh, Dogu Karadeniz (Eastern Black Sea), and Yesilirmak. The most important river basin in the DOKAP region is the Çoruh, which originates from the Mescit mountains (3,225 m). The river flows 466 km before reaching the Black Sea near Batum, Georgia. The river also includes Oltu creek (151 km) and Tortum creek (120 km). The catchment basin is 19,900 km^2 and its precipitation potential is 5.0×10^9 m^3. The Çoruh river is known as one of the fastest flowing rivers in the world by any rafting specialists. Fed by the melt waters of the Eastern Black Sea mountains, the river flow is at its highest in May and early June, later on in June the water levels will start to drop and the river becomes slightly less daunting. The river runs from the mountains down through spectacular canyons and lush fertile valleys, passing ancient castles and other historic sites. All this is set against the constant backdrop of the Eastern Black Sea mountains. The natural habitat of the Çoruh river remains undisturbed. As the Çoruh passes 150 km through the province of Artvin, the river cuts through steep and impregnable mountains before flowing into the Black Sea at Batum in Georgia. The highest waterfall in Turkey is on the Tortum river here. Some local tour operators organize up to five day, 135 km stretch rafting trips on the river, to which tourists from many countries are attracted.

The Dogu Karadeniz (Eastern Black Sea) watershed is located in the north of the main mountain chain. It consists of many small streams and torrents flowing in deep parallel south-north gorges, which contain numerous waterfalls. Some of rivers in the Eastern Black Sea watershed include Dogankent and Firtina rivers. These rivers have short courses but high water flows as the coastlines of the Black Sea is very steep. A thin layer of alluvium soil covers the valley floors.

The Yesilirmak basin partially covers the province of Gumushane. The basin has a total length of 519 km and the drainage area of the river is 38,000 km^2. The branches of the river include Kelkit river, Cekerek stream, Tersakan stream, and Mecitozu stream.

Table 1.1 Principle Watersheds in the DOKAP Region

River Basin	Length (km)	Catchment (km^2)	Provinces included	Population in Water Basin	Share in Turkey (%)
Yesilirmak	519	38,000	Gümüshane*	26,881	0.1
			Ordu	830,105	1.5
			Giresun	499,087	0.9
Eastern Black Sea	-	56,000	Trabzon	795849	1.4
			Rize*	205,104	0.4
			Gümüshane*	80,119	0.1
Çoruh	466	19,900	Bayburt	107,330	0.2
			Artvin	212,633	0.4

* These provinces are partially included in the catchment areas.
Source: Black Sea Environment Action Plan, 1999

1.1.5 Climate

Turkey is divided into five major climate zones: Mediterranean, Central Anatolian, Black Sea, Eastern Anatolian, and Southeastern Anatolian. Each zone has its own distinct climate, topography and consequently habitats, flora and fauna. The DOKAP region is located mostly within the Black Sea and Eastern Anatolian climate zones. The climates of the region can be largely divided into three unique characteristics: Coastal Climates, Highland Climates, and Inland Climates.

The Coastal Climate zone receives over 1,000 mm of rainfall. The Coastal Climate is mild with mean temperatures ranging from about 4°C in winter to about 23°C in summer. Annual rainfall between Rize and Hopa even exceeds 2,000 mm annually, which is very unique in Turkey for all-year-round rainfall and mist precipitation. This climate has much in common with that of Atlantic Europe and this is of phytogeographical significance.

The Highland Climate is characterized by low temperature and high snowfall in winter and relatively low temperature and humidity in summer. Some areas under this climate have very high rainfall all-year-round and mist precipitation. The sun may scorch alpine valleys while the valleys below are shrouded in mist. Only for a short period, between late August and early October, do the mists on the seaward slopes of the Anatolian Mountains disappear daily for any length of time. On the peaks of the main mountain ranges the temperature range is more extreme, from -16°C in winter to 12°C in summer.

The Inland Climate reaches its extremes in inland provinces with hot, dry summers when the temperatures may reach 42°C, and cold, snowy winters.

There are, however, a variety of micro-climate zones which have distinctive difference and unique climate character due to the complexity of topography,

altitude and other factors, such as land orientation and ground cover. Such differences may be manifested over very short distances.

Table 1.2 Climates of Selected Provinces

	Artvin	Giresun	Gumushane	Ordu	Rize	Trabzon	Bayburt
Av. Temperature (°C)	12.2	14.2	9.6	13.7	13.8	14.5	6.5
Av. High Temp. (°C)	17.3	17.9	15.9	17.5	17.4	17.8	13.1
Av. Low Temp. (°C)	8.3	11.4	4.3	10.6	10.9	11.6	1.0
Precipitation (mm/yr)	662.9	1,324.5	443.7	1,176.6	2,300.3	833.8	426.2
No of days with Frost	18.4	13.8	27.8	21.6	8.3	4.8	36.0

Source: General Directorate of Meteorology, 1998

Table 1.2 shows climates of selected provinces in the DOKAP region. Of seven provinces, Giresun, Ordu, Rize, and Trabzon show the characteristics of the Coastal Climate zone, while Artvin, Gumushane and Bayburt show those of the Inland Climate zone.

1.2 Flora and Fauna

1.2.1 Significance of Turkish flora and fauna

Turkey owns rich and unique flora and fauna. Anatolia serves as a passageway between the continents of Europe, Asia and Africa, and is enclosed on three sides by seas with substantially different characteristics. A variety of flora and fauna owes their geographical spread to this passageway. The topography of the Anatolian peninsula exhibits significant heterogeneity where ecological factors change greatly over very short distances. A large variety of climatic zones coexist due to its heterogeneous topography, and they affect the region's flora and fauna, both in quantity and in the range of species. A wide variety of living organisms have evolved and differentiated generously and have created a wealth of species and subspecies.

In the last 1.8 million years towards the end of the Quaternary Era, the earth underwent four ice ages that greatly influenced the world of living organisms. During the cold periods, several species of living organisms moved southward. This migration provided refuges to flee from unsuitable conditions in the north. Some of them returned to the north during periods between the ice ages, while some evolved to adapt to the new conditions of their environment. Others remained by taking refuge in various biotopes and underwent further differentiation. The distribution of flora and fauna along a north-south axis during these glacial periods shifted to an east-west axis during temperate intervals. This

furthers increase in the biological diversity. The combination of all these factors has resulted in a great diversity of native plant and animal species.

While Turkey lies in the Palaeartic zone of biogeography region, native species include those typical of the Oriental and Ethiopian regions. A taxonomic study of plant species shows that Turkey is the richest country in Europe and among its neighboring countries (Davis, Heywood and Hamilton, 1994). Turkish flora supports approximately 9,000 species, with a remarkably high level of endemism for a mainland country. Nearly 2,700 species are endemic, representing over 30% of the flora. Subsequent to the completion of the study, some 173 taxa have been added to the flora, representing an average of some 35 taxa new to the flora each year (Özhatay et al. 1995)

Examples of countries exhibiting high levels of plant diversity are given in Figure 1.3. Turkish flora is exceptionally important when compared with other countries in the Western Palaearctic.

Table 1.3 Plant Diversity and Endemism in the Western Palaearctic

Country (region)	No. of Species	Endemic Species	Percentage
Turkey (South West Asia/Middle East)	8,650	2,675	30.9%
Iran (South West Asia/Middle East)	8,000	1,400	17.5%
Italy (Europe)	5,600	712	12.7%
Former territory of Yugoslavia (Europe)	5,350	137	2.6%
Spain (Europe)	5,050	941	1.6%
Greece (Europe)	5,000	742	14.9%
Afghanistan (SW Asia/Middle East)	4,000	800	20.0%
Syria (SW Asia/Middle East)	3,100	395	13.0%
Morocco (N Africa)	3,675	625	17.0%
Algeria (N Africa)	3,164	250	7.9%
Canary Islands (Atlantic Ocean Island)	1,200	500	41.6%
Saint Helena (Atlantic Ocean Island)	60	50	83.3%
Ascension (Atlantic Ocean Island)	25	11	44.0%

Source: Davis at el, (1994)

Tree plant species of Turkey also exhibit a great diversity and high endemism. These plant species constitute complex and mixed ecosystem in the forest areas of the DOKAP region. *Quercus* (oak) is an important example of a genus of tree living in Turkish forests. Eighteen species of this genus exist naturally in Turkey. Two of them (*Q. aucheri* and *Q. vulcanica*) are native to the region, while in all over Europe there are 27 species.

In addition to this rich diversity of flora, Turkey is also considered as the genetic center of domestic plants. *Rosacaea* group, *Amygladus (almond)*, *Crataegus* (hawthorn), *Prunus* (plums, apricots and cherries), and *Pyrus* (pears) genera of

this family are well represented by various species, some of which are native to the Country. *Achillea* (yallow), *Allium* (onion), *Astragalus* (a perennial whose root is used as a traditional Chinese medicine), *Centaurea, Draba*, *Iris, Salvia*, and *Verbascum* (mullein) are among the genera whose genetic center is considered to be in Turkey. The large number of species of fruit trees might have originally evolved in Turkey. Table 1.4 includes some examples of plants originated from Turkey.

Table 1.4 Examples of Domestic Plants Originated from Turkey

Latin Name	Common Name
Amygladus	almond
Pyrus	pear
Avena	oats
Hordeum	barley
Secale	rye
Triticum	wheat
Ficus	fig

Latin Name	Common Name
Vitis	grapevine
Pisuum	peas
Vicia	broad beans vetch
Linum	linen
Allium	onion, garlic, leeks
Punica	pomegrenate
Ceracus	cherry, sour cherry

Source: Ministry of Environment

1.2.2 Characteristics of DOKAP flora and fauna

The two major mountain ranges in the DOKAP region, Dogu Karadeniz and Kelkit mountains, constitute effective barriers against the geographical diffusion of living organisms, which have become significant in geo-zoological analyses. The two mountain ranges join in a narrow corridor, which divides the Black Sea coast land from the Central Anatolia and the Kars-Erzurum plateau.

These mountains are exceptionally important for their biological compositions in the region. The evolutionary variation of many groups of living organisms was due to the effects of such obstacles. Especially during the ice ages and subsequent periods, these barriers prevented passage, and thereby limited the diffusion and consequent variation of populations. Faunistic interests include an important large mammal fauna (brown bear, wild boar, wolf, chamois etc.). Caucasian Black Grouses, Caspian Snow Cocks, and major migratory routes for raptors etc. are of great bird interests in the region. Animals living in such forest areas present a parallel diversity depending on the specific features of the ecosystems.

1.3 Flora of the DOKAP Region

1.3.1 Significance of DOKAP flora

Given exceptional climate that receives rainfall of over 2,000 mm/year, geology, and steep altitude change from the sea level to as high as 3,932 m in a short distance. The DOKAP region has a diverse variety of vegetation of which some

examples include Euxine/Colchic forest, Rhododendron scrub, upland and alpine grassland, scree, cliff and lake communities. The importance of the region to botanical science can be summarized as follows.

High botanical diversity: With nearly 2,500 species recorded, the DOKAP region supports about 28% of the Turkish flora. For its size this represents a phenomenally rich flora with the western palaearctic.

Number of rare species: 428 species regarded as being Nationally Rare (Ekim et al 1985) are recorded from the region. Turkey as a whole has about 4,400 rare (and/or insufficiently known) species recorded. Thus the region supports approximately 10% of all rare Turkish species.

Endemism: As indicated by Davis et al. (1994), high degree of endemism is a key factor of the flora of the DOKAP region. At least 2,460 species of vascular plants are known to occur in the region, of which approximately 300 (12%) are endemic to Turkey. About 160 species are known only from Northeast Anatolia. Examples of endemic species are shown in Appendix 1.

1.3.2 Forest ecosystems

The forest area in the DOKAP region is primarily found on the mountains bordering the Black Sea, and is located at an altitude belt of 0 to 2,000 m. Central and eastern parts of the regions are loosely covered with trees. The most common forest trees are *Quercus* (Oak) species.

One of the most significant forest systems found in the DOKAP region is Old Growth Forest. Old Growth Forest, primary forests, is not only important forest system in the DOKAP region but of global importance. The forests are little disturbed by human activities, with a high proportion of old trees reaching natural maturity, representing one of the most important and threatened habitats in the region. The forests host exceptional biodiversity and aesthetic value while providing protection against erosion and other benefits.

In addition, the forest ecosystems in the DOKAP region, consisting of Old Growth Forest, are identified as one of the globally most important forest ecosystems (World Wide Fund for Nature, 1996). Figure 1.2 shows the locations of major Old Growth Forests in Trabzon, Rize and Artvin provinces.

Source: Dogal Hyaati Koruma Dernegi (DHKD) (1996)

Figure 1.2 Location of Old Growth Forests in Trabzon and Artvin

1.3.3 Important forest ecosystems

(1) Firtina valley in Kaçkar mountains

The Firtina valley is one of the significant examples of forest ecosystems in the DOKAP region that maintain Old Growth Forest. Situated on the northern skirts of the Kaçkar mountain range, the Firtina valley bears riverine forest, temperate rain forest, sub alpine scrub communities, alpine grasslands, cliff habitats and many endemic species. The ecosystem is under serious threat by planned construction of hydropower plants. Although the plan is currently stopped by a court order, additional protective measures should be implemented in order to protect the globally important forest ecosystem (Appendix 2, Important Forest Ecosystems in the DOKAP region).

(2) Karcal mountains

Another important forest ecosystem in the DOKAP region is Karcal mountains in Artvin. Situated in northeastern Anatolia, the Karcal mountains hosts one of the best "Temperate Mixed Deciduous Forest" in Turkey. Main features are: old-growth pristine forest; sudden altitudinal changes possessing various ecosystems; high number of colchic endemics; traditional lifestyle which goes harmoniously with nature; and wildlife habitats. The area is situated on the migration route of raptors and regarded as one of the best brown bear habitats, not only in Turkey, but also in Europe (Appendix 2, Important Forest Ecosystems in the DOKAP Region).

1.3.4 Vegetation of the region

Quézel, Barbéro and Akman (1980) studied the vegetation of entire northern Anatolia including the DOKAP region in great detail. The study divides the vegetation into two broad types: Mediterranean and Euxine (meaning Black Sea in Greek).

Mediterranean vegetation is restricted to a narrow coastal strip, interrupted by human activities and "intra-Pontic" (Quézel, Barbéro and Akman, 1980) valleys. The latter run transversely between the mountain ranges which make up the Pontus chain. The Mediterranean vegetation enclaves in these valleys are all at altitudes not exceeding 600-700 m and occur mainly in the western part of the Anatolian mountains.

Undisturbed coastal Mediterranean vegetation consists of sclerophyllous shrubs and typical Mediterranean trees, such as *Carpinus orientalis*, *Phillyrea media* and *Arbutus andrachne*; characteristic herbaceous species include *Drycnium pentaphyllum* subspecies *herbaceum* and *herbaceum* and *Scutellaria albida*.

Degradation of Mediterranean vegetation results in thickets comprising *Cistus creticus, C. salviifolius, Juniperus oxycedrus, Arbutus andrachne* and associated herbs and grasses, such as *Origanum vulgare* and *Aira caryophyllea.*

Euxine (Black Sea) vegetation is further subdivided into various phytosociological (Plant-sociologic) groupings and associations. Main ones are described.

(1) Hornbeam forest

Hornbeam (*Carpinus orientalis*) forest occurs on seaward slopes at 300 - 400m on north- and east-facing slopes. The flora includes many Mediterranean elements, such as *Erica arborea, Ruscus aculeatus, Vitis vinifera* and *Cistus salviifolius*. *Oplismenus undulatifolius, Buxus sempervirens* and *Vinca minor* occur locally.

(2) Chestnut forest

Sweet chestnut (*Castanea sativa*) forest occurs from 200-1,000m, especially in sparsely populated districts. Chestnuts occur mostly as pure stands, but the ground flora is very rich and includes *Campanula alliariifolia, Cicerbita bourgaer, Lilium szovitsianum, Rhamnus imeretinus* and the *fern Pteris cretica*. In more thermophilous habitats, *Carpinus orientalis* is sometimes present along with *Omphalodes cappadocica, Hedera colchica* and *Iris lazica*

(3) Maritime pine forest

Pine (*Pinus sylvestris*) forests are very localized (near Of in Trabzon Province) from near the sea level to 400m altitude.

(4) Alder woodland

Alder (*Alnus barbata*) occurs on damp soils in the chestnut forest zone in the altitude range of 300-1,300m. Typical species include *Cardamine lazica*.

(5) Beech forest

These woods also include oak, hornbeam, yellow and black pine. At the eastern extremity of the Black Sea, fir is replaced by spruce, which is a tree capable of surviving at very high altitudes with lower humidity. In the DOKAP region, pine is more common. On south facing slopes extensive oak forest is dominant.

Beech (*Fagus orientalis*) forest woods begin at the higher levels, from 600-700 m upwards, and at 1,100-1,300 m a mixture of beech and fir begins, extending to as high as 1,800-2,000 m. Beech forms more or less pure, dense stands, with individual trees reaching 30m or more. The herb layer includes *Veronica magna, Arum orientale, Vicia lutea, Asperula odorata, Neottia nidus-avis, Bardamine bulbifera* and *Scrophularia scopolii*. Mixed beech/fir forests occur above the chestnut belt south of Giresun, and especially around Hamsiköy.

(6) Fir forest

Fir (*Picea orientalis*) forest occurs over 1,500-1,600m, above the mixed beech/fir belt. East of the Melet river, as far as the border with Georgia (and beyond), there are vast fir forest areas (of which 2,000km^2 occur within North-east Anatolia.) These forests include many relict species, such as *Epigaea gaultberioides, Rhodothamnus sessiolifolius, Betula medwedewii, Rhamnus imerelinus, Osmantbus decorus, Rhododendron caucasica, R.ungernii* and *R. smirnouii*.

(7) Montane pine forest

Scotch pine (*Pinus sylvestris*) forest occurs at 1,700-2,000m, especially near Giresun and Trabzon. These forests are snow-covered for 6-7 months of the year. Species present include *Vaccinium myrtillus, Pyrolaceae* subspecies, (e.g. *Moneses uniflora, Orthilia secunda* and *Pyrola rotundifolia*), *Scilla monanthos* and many hawkweeds (*Hieracium* subspecies).

In addition, on high passes of Euxine vegetation areas, i.e. aroung Zegra near Trabzon, there are three rich associations of coniferous forests. These are the following.

1) *Picea orientalis/Telekia speciosa* association on north-facing slopes. According to Quézel, Barbéro and Akman (1980), the wealth of flowers

during July is an unforgettable sight. Species include *Senecio lazicus, Symphytum asperum, S. savvalense* and *Cirsium pseudopersonata*.

2) *Pinus sylvestris/Lilium ciliatum* association on south-facing slopes. Typical species include *Lilium ciliatum, Euphorbia djimilensis, Vicia freyniana* and *Melampyrum arvense*.

3) *Pinus sylvestris/Daphne glomerata* association at 1,700-2,100 m on north-facing slopes. Species include *Geum coccineum, Leucorchis albida, Plygala alpestris* and other *sub-alpine* species. At high altitudes in the Anatolian mountains are deep acid peat communities resembling blanket bogs. These are localized in Turkey and support a flora which comprises species otherwise very rare in Turkey. These include *Carex lasiocarpa, C. magellanica* subspecie. *Irrigua, Drosera intermedia, D. rotungifolia, Eriophorum angustifolium, E. vaginatum* and *Rhynchospora alba.*

4) Tall herbs, such as *Geranium sylvaticum, Aruncus sylvester, Impatiens noli-tangere* and *Campanula latifolia* are common to all three associations.

1.4 Fauna of the DOKAP Region

1.4.1 Birds

Turkey is one of the most important passageways for birds migrating between large landmasses, in the north-south, and sometimes in the east-west directions. Twice a year, its land and water offer food and shelter to migrating birds, some of which also breed here. The Çoruh river valley is one of major migrating routes that link Africa and Europe. The Black Sea shore stretching to Bosphorus straight is another important route for migrating birds.

The DOKAP region holds a large and diverse bird population. The composition of birds population changes greatly with location. As indicated in the following, the region is of great ornithological importance. It is, however, difficult to indicate the prime areas since most breedings occur over the whole region. Complex geography makes it difficult to locate exact routes of migrating birds passing through the DOKAP region. There are limited studies and research covering detailed migration patterns of bird species in the region. There are a few attempts by using sampling and conventional bird count methods to understand the patterns. The following is based on such studies, although it only illustrates snapshots of birds species in the region.

(1) Sedentary (breeding) birds

The DOKAP region holds a large and diverse population of sedentary birds. The region qualifies for its breeding populations of Lammergeler (20 pairs), Griffon Vulture (20 pairs), Black Vulture (10 pairs), Golden Eagle (10 pairs), Caucasian Black Grouse (the Turkish distribution of which is confined to this region) and Caspian Snowcock. During 1993, a survey revealed the presence of 134 lekking male Caucasian Black Grouse at six of the localities studied. Given the small area surveyed and the wide availability of suitable habitat (*Rhododendron* or *Juniperus* scrub at 1,800-3,000 m) the entire population in the Kaçkar mountain range may be only around one thousand pairs.

(2) Migratory birds

The region is best known for the vast number of raptors that migrate through the region. The mountains and the sea force them to follow the north-south oriented valleys, and a staggering number of raptors have been observed at these bottlenecks. The most complete autumn count (in 1976) produced 380,220 birds including Honey Buzzard (138,000), Black Kite (5,775) and Buzzard (205,000), but the actual number of birds migrating through the DOKAP region may actually be much larger as important new passage points have been discovered in recent years.

According to a recent study (DHKD), spring passage involves a small number of birds (maximum 205,131 counts on a eight-week count session in 1994). The study identified many migrating routes previously unknown. They are linking between Asia, Africa, and Europe, passing over the DOKAP region. The actual number of birds species could be much larger. Honey Buzzard (25,183), Black Kite (9,069) and Buzzard (136,327) were included in the study. This has also been a factor in expanding the number of species found here for part of the year (Appendix 3 Example of migrating of raptors counts in the DOKAP region).

Appendix 4 gives a list of birds regularly found in the DOKAP region. A total of 48 SPECs (Status of Protection in EC) with Unfavorable Conservation Status (SPECs 1-3) occur in the DOKAP region; three are categorized as SPEC 1. Turkey as a whole has 112 SPECs 1-3, which makes it second in Europe after Russia that has 133 SPECs 1-3. It indicates the importance of Turkish habitat for birds. Compared with 62 SPECs 1-3 of Sweden, 48 SPECs 1-3 in the region is significantly high.

Table 1.5 Examples of Threatened Bird Species in the DOKAP Region

Status	Name of Specie	Name of Specie	Name of Specie	Name of Specie
Endangered	lammergeier	semi-colored flycatcher	saker	imperial eagle
	egyptian vulture	long-legged buzzarard	pallie harrier	
Vulnerable	black kite	black vulture	hen harrier	steppe eagle
	red-footed falcon	quail	crane	redstart
	black-eared wheatear	blue rock thrush	olivaceous warbler	chough
	rock bunting	ortolan bunting	black-headed bunting	lesser kestrel
Rare	black stork	griffin vulture	short-toed eagle	levant sparrowhawk
	lesser-spotted eagle	golden eagle	booted eagle	osprey
	peregrine			
Declining	turtle dove	kingfisher	bee-eater	roller
	wryneck	grey-headed woodpecker	green woodpecker	black woodpecker
	swallow	stonechat	rock thrush	spotted flycatcher
	red-backed shrike			

Source: DHKD 1995

According to SPEC status and European Threat Status, the DOKAP region holds seven endangered, 16 vulnerable, nine rare species and 13 declining species. Table 1.5 shows a list of threatened bird species found in the DOKAP region.

1.4.2 Mammals

Large mammals are well represented in the region, including Brown Bear, *Ursus arctos*; Chamois *Rupicapra rupicapra*; Ibex, *Capra aegagrus*; Wolf, *Canis lupus*; Wild Cat, *Felix silvestris*; and Lynx, *Lynx lynx*. The area is also important for a number of amphibians and reptiles, and at least three species of viper are recorded, included the endemic *Vipera pontica* which is found only in the Çoruh valley near Artvin. In addition, the area is known for its wide range of butterfly taxa. Colonies of red vultures, which are threatened with extinction, live among the rocks by the riverside. The area surrounding the river is rich in wildlife, including gray bear, mountain goat with hooked horns, wild boar, wolf, jackal, fox, badger, marten, water sable, rabbit, partridge, wild rooster, woodcock, wild duck, stock dove, golden oriole, siskin, fieldfare, pigeon and wood pigeon (Appendix 5).

1.5 Human Habitats and Environment

Because of the urbanization, the percentage of citizens living in cities increased from 45% in 1990 to 49% in 2000 in the DOKAP region. According to the

DOKAP population framework, proposed economic development measures encourage further urbanization by 61% in 2020. This presents concentrated problems that would be greater in urban settlements, particularly in informal settlements, where the supply of infrastructure and services cannot keep pace with demand.

There are a few areas in urban and rural environment that should address as main environmental issues in the DOKAP region.

1.5.1 Air quality

(1) Air quality in Turkey

The Ministry of Environment is responsible for monitoring air quality in Turkey.

According to the Black Sea Environmental Action Plan (BSEPA) conducted in 1998, energy use in Turkey is inefficient both in households and industry. Average household energy demand in Turkey is 195 kWh/m^2, while that of industrialized countries falls below the 100 kWh/m^2 level and their efforts are underway to bring it down to 50 kWh/m^2 (NEAP, 1998). Studies show that the industrial sector in Turkey could save at least 2.7-4.8 million ton oil equivalent (TOE) a year, which would reduce air pollutants. Turkey emits 8.8 kg of SOx for a US$1,000 contribution to the GDP each year while the OECD average is only 2.9 kg for the same economic output (OECD, 1994). Overall, Turkey produced $1.8 units of GDP per kg of oil equivalent (kgoe) consumed in 1994. While this is better than the average of $1.0 per kgoe in lower middle-income countries, the productivity is almost a half when compared with energy consumption in high-income countries (World Bank, 1997b).

Emissions of sulfur dioxide (SO_2) mainly stem from combustion of low quality lignite by industries, energy transformation and households using outdated and polluting technologies. Annual emissions are expected to increase rapidly from 1 million tons in 1985 to 3.5 million tons in 2010. In addition, NOx emissions are expected to jump from 357,000 tons in 1985 to 1.2 million tons by 2010, primarily from the use of lignite; while the share of households contributing is diminishing, pollution from the transport sector is growing.

Data from some cities, however, indicate that air pollution from particulates and SO_2 has declined during the past few years as there was major change in use of fuels. Low quality, high-sulfur domestic coal was banned from use for heating. High quality imported coal was introduced to replace it. Now natural gas is widely used in household in the place of coal.

(2) Air quality in the DOKAP region

Information on air quality in the DOKAP region is limited. Urban centers of Ordu, Rize, Trabzon, and Bayburt have observation stations. Only particulate matter and SO_2 are monitored regularly. The insufficient monitoring system makes it difficult to conclude that air quality in the region complies with emission regulation. In that context, limited data indicate that except for some industrial areas and secondary cities, air pollution is not a serious problem. Table 1.6 shows average annual SO_2 concentration and particulate concentration at the observation stations in the DOKAP region. None of observation stations indicates air pollution a serious environmental hazard in the DOKAP region. Fumes and smell of air in certain locations in the urban areas are unbearable. Given the nature of air pollution, of which the main source is automobiles, it is difficult to monitor it to prevent serious health risks.

Air pollution is caused by some industries that are equipped with less adequate reduction measures. Rapid urban growth in Trabzon also contributes to air pollution from motor vehicles and domestic sources.

Table 1.6 Average Yearly SO_2 Concentrations and Change at Observation Stations in the DOKAP Region

Station	Average SO_2 ($\mu g/m^3$)				Yearly Change			
	Years				Periods			
	1994	1996	1997	1998	1995/94	1996/95	1997/96	1998/97
Ordu	33	33	35	36	6	-6	6	-
Rize	65	61	38	-	-19	11	-38	-
Trabzon	51	44	-	-	-4	-10	-	-
Bayburt	-	-	-	-	-	-	-	-
Legal limits	General Area:		Long-term Limit		150	Short-term Limit:		400
	Industrial Zone:		Long-term Limit		250	Short-term Limit:		400

Source: State Institute of Statistics, 1999

Table 1.7 Average Yearly Particulate Concentrations and Change at Observation Stations in the DOKAP Region

Station	Average Particulate ($\mu g/m^3$)					Yearly Change			
	Years					Periods			
	1994	1995	1996	1997	1998	1995/94	1996/95	1997/96	1998/97
Ordu	42	46	47	43	-	10	2	-9	-
Rize	112	87	99	80	-	-22	14	-19	-
Trabzon	46	56	44	-	-	22	-21	-	-
Bayburt	-	-	-	-	-	-	-	-	-
Legal limits	General Area:		Long-term Limit		150	Short-term Limit:		300	
	Industrial Zone:		Long-term Limit		200	Short-term Limit:		400	

Source：State Institute of Statistics, 1999

There are 146,427 motor vehicles in the DOKAP region, about 2.5% of the national total. According to Güvendik et al (1994) total emission of lead in Turkey was estimated to be at least 1,100 ton annually in 1994. This indicates that at least 27.5 tons are emitted in the DOKAP region alone. Given a high percentage of use of leaded gasoline (97% nationally in 1994), this figure is alarming.

Table 1.8 shows the number of motor vehicles in the DOKAP region. Although the number and the density of motor vehicles in the DOKAP region are still half the national averages, the effects of motor vehicle emissions should be taken seriously along major roads. The proposed economic development should accelerate the number of motor vehicles in the region. Unless new cars that consume only unleaded gasoline are introduced, lead emission would increase in the DOKAP region. The gradual replacement of the vehicle stock with cleaner and more efficient vehicles probably would contribute to better air quality.

Table 1.8 Motor Vehicles in the DOKAP Region (1997)

Provinces	Motor Vehicles		per 10,000 population	
		Private Car	Motor Vehicles	Private Cars
Artvin	12,160	6,441	661	350
Giresun	22,111	11,547	480	251
Gumushane	6,284	3,209	408	208
Ordu	32,996	19,958	393	238
Rize	22,002	11,323	676	348
Trabzon	47,173	26,332	557	311
Bayburt	3,701	2,161	371	217
DOKAP	146,427	80,971	494	273
Turkey	5,943,073	3,649,199	945	580

Source: State Institute of Statistics, 1999

1.5.2 Water quality

The State Directorate of Water (DSI) is responsible for water quality observation. According to Water Pollution Control Regulation, a total of 45 parameters (physical, inorganic, organic and bacteriological) are classified, but only limited number of these parameters are constantly monitored. Water quality observation stations tend to concentrate to the western regions of Turkey. Limited data are available because of insufficient frequency and the scope of data collection.

Within the DOKAP region, only Degirmendere and Kalyan streams have systematic water quality observation carried out by DSI. The Degirmendera stream is one of the major sources of drinking water in Trabzon. Increased population and solid waste disposal near Macka on the Degirmendere stream pose threats to human health while the data are insufficient and monitoring infrequent.

Another water quality problem is seen in the Coruh river downstream of the Murgul stream. The town of Murgul (Göktas) in Artvin province possess rich copper beds. The mine employs open cut method for excavation, and untreated water used for washing minerals is dumped directly into the Murgul stream, a branch of the Çoruh river.

Groundwater is considered as an important source of safe drinking water in rural areas in the DOKAP region. Traditionally it has been widely used for source water of small-scale water systems in settlement areas. Groundwater is increasingly polluted because of urbanization and rapid population growth in upstream areas. There is no systematic monitoring of groundwater quality. Diffusion of household wastewater to the groundwater is a major cause of possible contamination because sanitary infrastructure is insufficient in most part of the DOKAP region. Majority of settlement areas equipped only with primitive means of sanitation, leading almost all household liquid wastes diffused into the groundwater. Also existence of detergent agents within the groundwater is an important indication of this type of pollution.

1.5.3 Organized Industrial Zones

Local governments of the DOKAP region provide incentives for industries to locate in Organized Industrial Zones (OIZ). They are vital to economic development as they promote entrepreneurship and contribute to local economy. In the DOKAP region, there are three operational OIZs. They are located in Trabzon, Ordu, and Giresun (pages 3-9 of Volume III Economic Sectors Report).

From an environmental point of view, small industries pose special pollution problems since they have limited access to such environmental measures as incentives to modernize technology, to install waste treatment facilities, and to raise public awareness through environmental education.

For example, industrial wastes present the major factor in pollution of groundwater. According to Law of Industrial Estates, construction of a water treatment facility prior to its operation is a requirement of establishing an OIZ. Most OIZs, however, do not comply with the requirements. The law provides that these OIZs can connect to municipalities' sewage systems if they are available. This allows, however, industrial wastes to discharge directly into the Black Sea, watersheds or ground without any proper treatment as no municipalities in the DOKAP region have installed such sewage treatment systems.

1.6 Marine and Coastal Environment

1.6.1 Marine environment

(1) Characteristics

Due to the excessive input of freshwater, the surface water of the Black Sea is low in salinity. Because of inflow from Mediterranean water, which is rich in salinity, a permanent salinity layer (halocline) is formed. The layer continuously collides with the boundary between the oxygen-rich and the oxygen-poor water. The overall current systems work as a large-scale cyclonic system in the east and west of the basin. Because of the effect of the current system, the coastal part of the sea or continental shelf is covered with oxygen-rich water. As a result of the slow inflow from the Mediterranean water entering through the straights, the amount of oxygen-rich water added to the deep water is not sufficient to balance the oxygen required by the organic matters in the sea. As a result, there is always oxygen deficiency below the halocline. This continuous process has been a characteristic of the Black Sea for thousands of years.

Black Sea watersheds encompass vast fertile regions. The inflow water contains rich organic materials. Sulfate is used as a source of oxygen in the biological decomposition process, and therefore the seafloor is covered with a layer of hydrogen sulfide-containing water. This makes most life impossible at that depth.

The pollution load of the Black Sea is relatively high from natural causes and wastes deposited from large rivers from several countries including Turkey. Pollutants from 16 countries flow in and 160 million people live in its catchment basin. The Danube river alone discharges 60 tons of mercury, 1,000 tons of chromium, 4,500 tons of lead, and 50,000 tons of oil annually, which, in turn, affect the Sea of Marmara and the Aegean.

The aquatic environment of the Black Sea helps support bacteria found in sewerage systems. They can remain alive longer in the Black Sea than other seas due to relatively low solar radiation, water temperature and salinity.

(2) Black Sea marine ecosystem

The Black Sea is rich in plankton and in the fish that live on this biomass making it Turkey's most important fishing area. The sea is abundantly stocked with valuable sturgeon and other fishing ground.

Turkey's fishing industry yields about 600,000 tons annually, which ranks 50th in the world, up from 300,000 tons a year at the beginning of the 1990s. An estimated 247 species inhabit the Black Sea. Despite its fewer species, the Black

Sea is richer in terms of fish populations. For example, while fish yield per ha is 5-10 kg in the Mediterranean and 25-30 kg in the Sea of Marmara and the Aegean, it is 80 kg in Black Sea or as high as 150 kg in the eastern section. The Black Sea accounts for 84% of Turkey's fish production in 1990 (Atay, 1990) and 77% of Turkey's fish production in 1996 (SIS, 1996b).

However, catches have been declining due to over fishing and the sea's changing ecosystem, resulting from a new ctenophore (Mnemiopsis) introduced through the ballast water of ships. The damage to fish hatcheries may be occurring due to shoreline erosion. Fishing potential has dropped from 580,000 tons a year in 1988 to 290,000 tons in 1991, while it recovered to around 550,000 tons in 1995.

As an outlet for the products of Ukraine and adjoining republics, the Black Sea is of special importance in regional commerce. The principal ports are Odessa, Kherson, and Sevastopol in Ukraine; Novorossiysk in Russia; Constanta in Romania; Burgas and Varna in Bulgaria; and Eregli, Samsun, Sinop, and Trabzon in Turkey.

1.6.2 Coastal environment

Uncontrolled growth and development pressure has been one of the main causes of coastal and near-shore degradation and environmental problems in the Black Sea coastal environment. Such urban growth and coastal development have increased as a result of legislative and institutional arrangements designed to accommodate urban sprawl. Land reclamation of coastal shores is a major threat to coastal environment in the region. Infrastructure for waste collection and disposal in the region is inadequate. Finally, haphazard coastal construction has further deteriorated the natural landscape and created aesthetic degradation in many areas.

CHAPTER 2 PROTECTED AREA MANAGEMENT AND CONSERVATION

2.1 Institutional Arrangements for Protected Areas

The concept of protected area management and conservation in Turkey started as early as 1937 when Land Hunting Law (number 3167) was enacted. Among institutional structures responsible for protected areas of Turkey, the Ministry of Forestry (MOF), the Ministry of Agriculture and Rural Affairs (MARA), the Ministry of Culture (MOC), and the Ministry of Environment (MOE) play important roles.

Preservation of many cultural and historical assets has been included in various laws such as those on Forests, National Parks, Preservation of Natural and Historical Assets, Environment, Coasts, and the Bosphorus. Turkey has 32 national parks, four of which were given this status for their historical significance. There are also 11 natural parks, 54 natural monuments, 32 natural preserves, 118 wildlife preservation areas, 1,003 natural entities and 396 natural sites, 3,029 archeological sites, 118 urban sites, 115 historical sites and 199 others of different merits. Other assets include 31,047 examples of civilian architectural heritage, 5,265 religious, 5,126 cultural, 755 administrative, and 397 industrial/commercial structures, 1596 cemeteries, and 182 cemeteries for martyrs. In addition, there are 189 mausoleums and monuments, 702 historical remains, and 12 special protection areas, shores and coastal strips.

Other natural and historical assets may be listed within legislative acts on Public Works, General Hygiene, Agricultural Activities, Agricultural Quarantine, and Groundwater Reserves, as well as various regulations and international conventions.

2.1.1 Ministry of Forestry

MOF takes the leading role in conserving forest areas. MOF owns and manages 20,703,122 ha of forest in Turkey, which is about 98% of forest area of the Country. The forest area accounts for 27% of the total area of Turkey.

(1) General Directorate of National Parks, Game and Wildlife

Within the MOF's organizational structure, the General Directorate of National Parks, Game and Wildlife (GDNPGW) is responsible for the designation and management of the majority of Turkey's various categories of protected areas (i.e. National Parks, Nature Parks, Nature Reserve Areas, Nature Monuments, and Wildlife Reserve).

According to Article 11 of Forest Law, the mandates of GDNGPW are described as follows:

a) To carry out the activities related to the reservation, conservation, planning, organization, development, promotion, management and operation of the National Parks, Nature Parks, Nature Monuments, Nature Reserve Areas and recreation areas (In-forest Recreation Areas);

b) To fulfill the mandates given by Law on National Parks, law number 2873 (Dated 09.08.1983);

c) To carry out the works and to set procedures, related to conservation and development of protected lands, game and wildlife, in-forest water resources, rivers, lakes, artificial lakes and wetlands, by regulating and controlling game hunting, conducting studies, implementing inventory, planning, and establishing facilities related to above services; and

d) To carry out the other duties which are given by the Ministry.

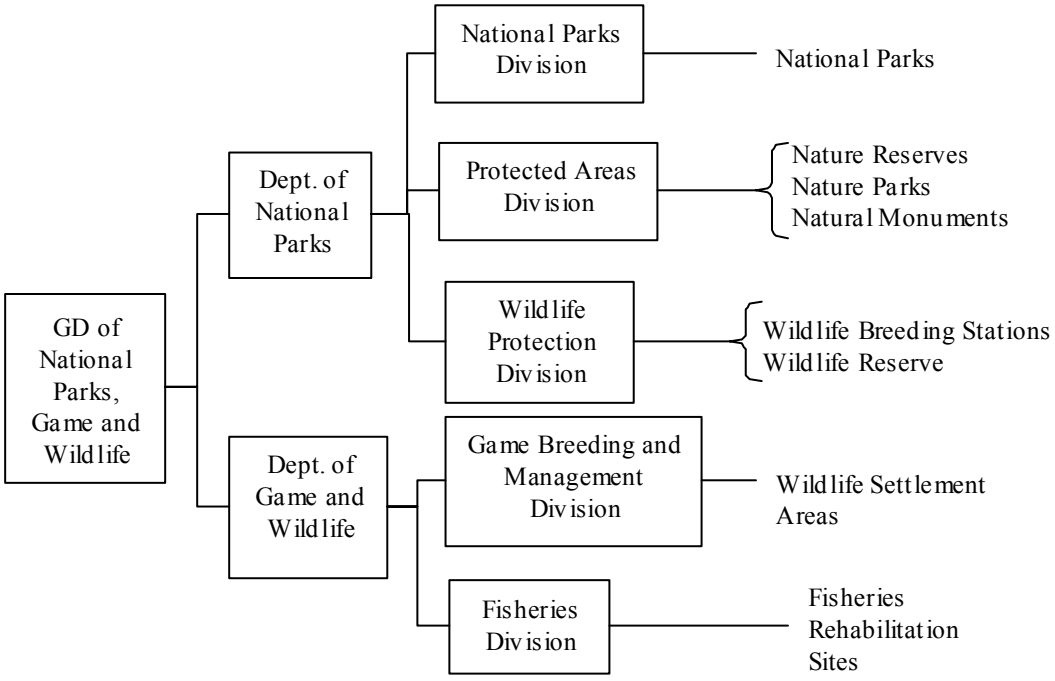
Through its nationwide network of regional directorates and field-based staff, GDPGW undertakes these mandates.

(2) Organizational arrangements of GDPGW

Within GDNPGW, there are two separate departments, namely the Department of National Parks, and Department of Game and Wildlife. Under these departments, there are five divisions. These divisions are responsible for management and supervision of eight different categories of protected areas. Each division has separate responsibility for preparation of their own management plans, survey and inventory of sites, and data management.

The organizational chart in Figure 2.1 shows organizational arrangements and category of protected lands managed by GDNPGW. At the Central Government level, under the leadership of general director, there are two assistant general directors, four department chairmanships (National Parks, In-forest Recreation Areas, Planning and Coordination, and Game and Wildlife) and 15 branch directorates and one accounting officer for the fund of national parks.

At the provincial level, there are nine regional directorates under the authority of MOF. Six branch directorates of National Parks supervise protected lands. Each branch directorate of National Parks reports to regional directorate of MOF.



Source: Ministry of Forestry, General Directorate of National Park, Game and Wildlife

Figure 2.1 Organizational Arrangement of GDNPGW and Protected Lands

(3) Other branches of MOF

The General Directorate of Forestry (GDF) of MOF has important roles for production and conservation of all state forest areas. The directorate, one of other branches of the ministry, is responsible for planning and management of forest areas. The directorate is responsible for utilizing forest products, and thus it has a significant impact on the protection of the forest ecosystems and biodiversity.

The Forest Trees and Seed Improvement Institute (FTSII) is the other important institution responsible for establishment of various in-situ (seed stands, gene management zones) and ex-situ (seed plantations, seed orchards) protection sites.

2.1.2 Ministry of Environment

(1) Specially Protected Areas

The Ministry of Environment (MOE) was established in 1991 to control and implement policies for environmental protection, sustainable development and management of natural resources. MOE provides the legal framework for environmental management of selected sites, primarily coastal sites that are

threatened by land speculation such as industrial, agricultural, and tourism developments. These protected areas are categorized as Specially Protected Areas and MOE has the authority.

(2) Environmental impact assessment

Another important role that MOE plays is overseeing of environmental impact assessment (EIA) procedures. The Turkish Environmental Law requires EIAs be prepared prior to investment decisions for development that are likely to cause environmental problems. The objectives of EIA are to prevent or reduce negative impacts of planned activities in order not to harm the environment. The regulations were issued in 1993.

The EIA process in Turkey requires to evaluate meteorology and climate, geology, water resources, thermal and geothermal resources, soil, plant cover, agricultural areas, forest areas, protected areas, landscaping criteria, flora and fauna, stock breeding, mines and fossil fuel sources. The EIA report should not only include these physical environmental factors but also the social and economic impacts of the proposal on the public health, income and employment of the affected area. Solid and liquid waste quantities to be generated by the project should also be determined and their potential impacts assessed.

According to EIA regulations, a certificate must be issued upon completion of an EIA, with either a 'positive' or 'negative' opinion depending on the finding from the report. The authority responsible for issuing the certificate is MOE, but the 'Local Environmental Committee' whose members are experts in relevant fields give a decision on the appropriateness of the EIA report.

2.1.3 Ministry of Culture

The Ministry of Culture (MOC) is responsible for designation and conservation of cultural heritage sites and natural features. Under the Law of Conservation of the Culture and Natural Object, MOC forms the Superior Committee for the Conservation of the Culture and Nature Objects designate Natural Site Areas. MOC is responsible for designation and conservation of cultural heritage sites and natural features.

2.1.4 Other institutions

Universities and other research institutions are engaged in in-situ and ex-situ conservation activities through their projects. Ankara University, for example, has

the most extensive collection of seeds and tissues of agricultural plant species outside governmental institutions.

New legislative arrangements under the Law of National Mobilization for Afforestation promote creation of forest with contribution of the public, the private sector and other organizations. The Government provides subsidies and technical support, and allocates afforestation areas to encourage citizens to participate in afforestation activities. Apart from Government's role to promote afforestation, the law promotes use of species with 'social values' (e.g. *Pinus pinea* for production of nuts) with contribution from general public, the private sector and other organizations. Although the promotion of these species alone may not guarantee the protection against erosion unless species used are carefully selected depending on various conditions of the proposed afforestation area, these incentives are effective for mobilizing the public to participate in afforestation.

2.1.5 Role of NGOs and other institutions

Today the potential role of NGOs and the private sector is increasing significantly. While government resources are limited, the opportunity exists to mobilize NGOs and the private sector to support government management of protected areas. Some Turkish NGOs already develop skills needed to manage sustainable use of Turkish natural resources. National and international NGOs have undertaken detailed ecological surveys, and others have been working effectively with rural communities and local governments to stimulate rural development. There exist increasing needs for NGOs to strengthen their catalytic role by providing training, and including them as legitimate intermediaries in society to assist governments. There is a need for developing mechanisms to assist governments to work with NGOs, the private sector and local communities together effectively to address the new and urgent cross-sectorial needs of protected area management and biodiversity conservation in Turkey.

2.2 Protected Areas in Turkey (National Parks System)

(1) Historical background

The legal framework for protection of natural habitat through preserving land was introduced to Turkey as early as 1937 when the Land Hunting Law was enacted as the first legal framework to protect hunting resources and fauna in wild land. There were a few evolutions in protecting natural resources through land protection. In 1956, the Forest Law was revised and provided a legal framework

of forest protection. In Article 4, forests are divided into three categories: a) Conservation Forests, b) National Parks, and c) Production Forests. The Forest Law provided the first legal framework for National Parks in Turkey. The park system, however, was only allowed to designate within forest areas. In 1958, the Yozgat Pine Grove region was reserved and declared as the first National Park of Turkey. Since then, 17 National Parks have been reserved under the Forest Law.

Article 25 of the Forest Law defines five purposes of National Parks: " (1) to utilize the park for scientific purposes; (2) to protect the nature; (3) to maintain aesthetic values of the Country for generations to come; (4) to meet various sports and recreational needs of the people; and (5) to develop tourism resources.

It was gradually recognized that the Forest Law alone could not provide a legal framework of protection for the superior resource values. In 1983, the National Park Law was enacted in response to the needs of protecting the land outside the forest regime that the Forest Law does not cover.

(2) National Park Law

The new National Park Law provides a legal framework of protected area inside and outside forest area. It defines five different types of protective status: namely, 1) National Parks, 2) Nature Parks, 3) Nature Monuments, 4) Nature Reserves, and 5) Wildlife Reserves. GDNPGW of MOF manages these protected areas, although some of them may be situated outside forest regimes.

a) National Parks

A National Park is an area that has, from the scientific and aesthetic points of view, nationally and internationally important natural and cultural values. The park is maintained for protecting nature, recreational use and tourism. There are four National Parks in the DOKAP region, and the total area of the parks is 77,127 ha.

b) Nature Parks

A Nature Park is a natural area that maintains a significant vegetation, feature of wildlife and suitability for recreational activities. There is one Nature Park in the DOKAP region.

c) Natural Monuments

A Natural Monument is a natural area that has characteristics and scientific values brought by phenomenal movements and activities of nature. These

areas should be protected within the principles of National Parks system. There are four Natural Monuments in the DOKAP region.

d) Nature Reserves

A Nature Reserve is a natural area designated only for scientific and educational purposes, which contains rare, threatened and endangered ecosystems and/or species. A Nature Reserve consists of highest level of biodiversity and natural values while the effects of human activities should be strictly minimized. There is no Nature Reserves in the DOKAP region.

The total number and the areas that are reserved and established in the DOKAP region by GDNPGW are shown in Table 2.1.

Within these four categories, Nature Reserve is the highest protection status where the area consists of highest biodiversity and natural value while the effects of human activities should be strictly minimized. National Park, Nature Monuments, and Nature Park follow, and in the latter three categories, limited human activities are permitted within the balance between protection and human use.

In addition to the five protection statuses defined above by the National Park Law, the Forest Law provides additional protection categories in forest areas such as 6) Wild Life Breeding Stations, 7) Wild Life Settlement Areas, 8) Wildlife Reserves, 9) Seed Stands, 10) Gene Protection Zones, and 11) Arboretums.

Table 2.1 National Park Systems in the DOKAP Region

Name and Type	Province	Area (ha)	Year Established
National Park			
Altindere	Trabzon	4,800	1987
Kaçkar Mountains	Rize	51,550	1994
Hatila Valley	Artvin	16,998	1994
Kara Göl	Artvin	3,776	1994
Nature Park			
Uzungöl	Trabzon	1,625	1989
Nature Reserve			
Camburnu	Trabzon	180	1993
Ormcek Ormani	Gumushane	263	1998
Camili Gorgit	Artvin	491	1999
Camili Efeler	Artvin	1,453	1999
TOTAL		81,136	

Source: General Directorate of National Parks, Game and Wildlife, Ministry of Forestry

2.3 Conservation Programs

2.3.1 Important Bird Areas (IBA)

In 1989 the Bird Life International and Wetlands International (formerly known as the International Waterfowl and Wetlands Research Bureau, IWRB) published "Important Bird Areas in Europe", as a major contribution towards bird conservation in Europe. This book provides the first comprehensive listing of priority sites for bird conservation across Europe in a standardized manner. The book describes 2,444 sites, of which 79 sites are located in Turkey. Concerning the importance of Turkey for birds and the relatively poor state of bird and nature conservation, Bird Life International funded DHKD (Dogal Hayati Koruma Dernegi-the Society for the Protection of Nature, Turkey) for the publication of a Turkish language version of the Turkey section of this book. This Turkish Important Bird Area (IBA) inventory formed the basis for one of the DHKD's major long-term conservation projects, the "IBA project", which started in 1990. This project aimed to promote conservation of Turkish IBAs via public awareness, undertaking advocacy and campaigning activities, lobbying for the designation of the protected areas, and monitoring developments at the IBAs and identifying new sites.

IBAs are ecosystems of international significance for the conservation of birds. Standardized and agreed criteria are applied for selection of sites. IBAs should be large enough to support self-sustaining populations of bird species of importance. IBAs include, wherever appropriate, existing protected area networks and they should be amenable to conservation. IBAs should form part of a wider, integrated approach to biodiversity conservation that embraces sites, species and habitat protection.

One of the main products of this "IBA project" is the "Important Bird Areas in Turkey (Magnet & Yard)" book published in 1997 by DHKD. This book describes the ornithological importance of, and conservation threats to, Turkey's 97 most valued bird areas with maps and bird drawings.

There are two IBAs in the DOKAP region: Eastern Black Sea mountains (Trabzon, Gumushane, Bayburt, Rize, Erzurum and Artvin) and Akkus Adasi.

The Eastern Black Sea Mountains IBA includes a major bottleneck of migratory birds of prey (the Çoruh valley and many other valleys that raptors use to cross the mountain range), as well as three major mountain ranges (Soganli, Kaçkar, and Karçal). They are noted for extensive forests and alpine habitats (representing a fine example of Eurasian high mountain habitat). The IBA includes two

National Parks: Hatila Vadisi (17,104 ha, designated in 1994) and Kaçkar Daglari (51,550 ha). Other protected areas included are the Camburnu Nature Reserve (180 ha, 1993), the Uzungöl Nature Park (1,625 ha, 1989), the Çoruh Vadisi Permanent Wildlife Reserve (8,700 ha, 1971), the Verçenik Permanent Wildlife Reserve (3,492 ha, 1981), and the Kaçkar Permanent Wildlife Reserve (4,143 ha, 1973), which falls within the Kaçkar Daglari National Park.

The other IBA, Akkus Adesi is located near Ordu-Persembe and has 2 ha of total area. It is a small islet along side the Black Sea shore. Although small, it is a habitat for migrating birds traveling along the Black Sea shore. Currently, there are no protective actions taken for conservation of this IBA.

2.3.2 Other interventions by international organizations

The World Bank is implementing the Integrated Natural Resources Management Project in Turkey's four different biogeographic zones since March 1998. It is the second Global Environment Facility's biodiversity conservation project in Turkey.

One of the project sites is located near Camili Forest District in Karcal mountains of Artvin. The site consists of Caucasian mixed temperate rain forest including high alpine meadows of North East Black Sea mountains (27,000 ha, altitude 400-3,500m). The area is adjunct to the Republic of Georgia and includes some of the region's last pristine and natural mixed forest. The local economy (population 2,700) is currently based on traditional and sustainable subsistence agriculture, and the production of honey (from lime and chestnut blossom) and livestock products for barter and sale. Due to its remote location and proximity to the international border, Camili is the only forest district in the northeastern Black Sea mountains that has not yet been logged or developed for tourism. However, the district currently has no protection status and, unless carefully integrated within the context of a conservation and rural development program, current plans to harvest timber, construct roads and fish farms, and to encourage tourism, constitute an imminent threat to the biodiversity and ecological integrity of this important site.

The objective of the project is to strengthen the capacity for preparation and implementation of protected area and conservation management plans at both the field and central levels. The objective would be achieved within the context of management plans for priority conservation sites such as Camili Forest District in the DOKAP region.

The project would focus primarily on field activities, including support for development initiatives that establish links between biodiversity conservation and economic benefits for local communities, applied research, capacity building and awareness building. The project will develop mechanisms for biodiversity conservation within the production landscape among buffer zone communities. Promotion of biodiversity conservation in the production landscape not associated with protected areas is important but not feasible within the budget and scope of the proposed project. However, lessons learned at the proposed projects demonstration sites could assist in developing more broad reaching conservation programs.

There are five major components in the project.

(1) Development and implementation of conservation management plans (with the involvement of local communities).

(2) Protected area management - including provision of field equipment and facilities, and information technology that is specifically needed for implementation of the proposed project. Implementation of management plans will include further development and application of wildlife monitoring and management techniques, implementation of land use planning in buffer zones, and the preparation and implementation of plans for sustainable use of demonstration site natural resources (grazing, forest products and tourism, etc) involving the participation of local communities and NGOs.

(3) Appropriate economic initiatives - these would be supported, if appropriate, following a review of all ongoing and leading government and the NGO initiatives. This could entail demonstration of site-specific socioeconomic development initiatives that provide a link between biodiversity conservation and economic benefits for local communities.

Such activities could possibly include the following:

i) Rural tourism and related developments (e.g., provision of accommodation in traditional homes, guiding/interpretation, establishment of associated cottage industries, such as handicrafts and the marketing of local produce, etc), and

ii) Sustainable natural resource management (e.g., sustainable agriculture, grazing, non-timber forest products, apiculture, wildlife and fisheries, etc). Mechanisms for provision of this assistance would be developed

during project preparation.

(4) Capacity building - within key government agencies and NGOs involved in project implementation at both the field and central levels. This could entail a preliminary institutional needs assessment followed, if appropriate, by reorganization, participatory planning by objective and implementation of long term staff development and training programs (mostly in- country, but they may also include some short term study tours and training overseas, and exchange work programs with other relevant countries). Capacity building is likely to involve training of local staff at the selected sites. Training in ecological monitoring, land use planning, working with local communities, interpretive guiding, and gardening will probably be included in the project. In addition, the project will develop mechanisms for regional collaboration (including exchange of regional expertise, shared training, etc.) to support and consolidate biodiversity conservation throughout the region.

(5) Public awareness and education - including the establishment of mechanisms for the involvement of local community based organizations, links with local, national and international media, and provision of facilities for site interpretation for visitors.

CHAPTER 3 DEVELOPMENT STRATEGY FOR ENVIRONMENTAL SECTOR

3.1 Issues Affecting Overall Environmental Sector of DOKAP Regional Development

3.1.1 Constraints identified by National Environment Action Plan (NEAP)

The National Environmental Action Plan (NEAP) was prepared in 1998 by SPO and the Ministry of Environment (MOE) in order to identify the nation's causes of deteriorating environment and natural resources. A series of workshops and discussions were held to elicit stakeholders' input and to generate realistic action plans to tackle the nation's environmental problems. In the process the NEAP has identified that Turkey's environment sector has a few management constraints. They are:

1) Over-reliance on regulatory approach;
2) No integration of environmental variables in planning tools;
3) Limited avenues for public participation;
4) Inadequate public resources to implement environmental laws;
5) Relevant information not available, analyzed nor applied;
6) Budget, authority and information overly centralized;
7) Extensive legislation but low level of awareness; and
8) Extensive education system but inadequate educational contents.

Specific examples of these constraints and major consequences are listed in Table 3.1.

3.1.2 Constraints of DOKAP environmental sector

In addition to the constraints listed above, region-specific constraints in the DOKAP region were identified. They are described below.

(1) Lack of policy coherency and insufficient coordination

Turkey has 35 laws, three decrees of law status, 23 regulations, and 10 circulars related to environmental issues (Black Sea Environmental Priority Study, 1998). Many laws provide frameworks for environmental protection, but they create many un-funded and under-funded mandates to responsible agencies and local governments.

Table 3.1 Consequences of Managerial Constraints

Constraint	Examples	Major Consequences
Over-reliance on regulatory approach	Environmental management by plans, fixed regulations and EIA	Environmental management is more costly, less effective than a balanced mix of economic and regulatory instruments.
No integration of environmental variables in planning tools	Local development plans do not directly address environment	The most prevalent management instrument that affects the environment cannot directly deal with priority environmental problems
Limited avenues for public participation	Many NGOs but little involvement indecision-making	Without real stakeholder participation, the planning, implementation and evaluation of policies and projects is less effective and more costly
Inadequate public resources to implement environmental laws	Compliance with EIA decisions is not monitored	Insufficient staff, budgets, information, and equipment mean that public authorities cannot achieve environmental policies and objectives
Relevant information is not available, analyzed or applied	Many environmental statistics but seem not affect decisions	Unclear link between environmental data, analysis and decision-making results in resources wasted on data collection and informed decisions
Budget, authority and information are overly centralized	A relatively low 22% of all environment-related investments are made by local authorities	Centralization means that local authorities cannot tackle the many local environmental problems; the central government assumes responsibility but is less efficient at addressing local issues
Extensive legislation but low level of awareness	Waste and EIA rules are largely unknown by relevant officials	Environmental objectives and policies cannot be achieved when those responsible for implementation are unaware of key regulations
Extensive education system but inadequate educational content	11.5 million students potentially receive inappropriate information on the environment	Formal education does not contribute to environmental awareness

Source: National Environmental Action Plan (1998)

Effectiveness of these laws is hindered by lack of resources and technical support. These factors weaken the mechanism and the power of enforcing these laws. As a result, the laws only create complex and unclear procedures, and bureaucracy.

For example, many laws and regulations concerning Turkey's water quality is not effective as intended. Turkey also has appropriated and signed many international agreements and treaties in protecting water quality. In reality, however, Turkey is identified as one of the major polluters of international water.

By law, municipalities are responsible for majority of environment-related public investments, such as solid waste management and wastewater treatment. The development of improved solid waste and wastewater management services requires substantial investment and financial resources. The Municipal Law, however, does not allow municipalities to charge directly for domestic waste

collection and disposal based on quantity and quality. Instead, the Environmental Cleansing Tax, a national tax, was introduced in 1993 as a means of increasing municipal revenues for financing solid waste management services in Turkey. Various resources such as human resources, tax revenue, and expertise, allocated to local governments are insufficient and weak. The tax rates to be charged were determined in 1994 by the Central Government based on the house size in square meters. According to the law's provisions, these rates are adjusted by half the rate of inflation each year. Given high rates of inflation, this causes decline in real tax revenue.

With many laws and regulations, different branches of the Government have different authorities in a variety of resources management. For example, under MOE, the Agency for Specially Protected Areas provides the legal framework for environmental management of selected, primarily coastal sites that are threatened by land speculation, industrial, agricultural, and tourism development. The Ministry of Culture is responsible for designation and conservation of cultural heritage sites and natural features. Each ministry has its own management plan for the lands under its jurisdiction. Such overlapping mandates create unclear responsibility and limit of power. Communication and coordination among agencies are, in most cases, almost lacking. Such a lack of coordination further perpetuates neglect and disregard to compliance of laws and regulations.

(2) Increased accountability in EIA procedure

Inadequate policy related to environmental impact assessment (EIA) is another area that should be improved. MOE has sole jurisdictions in the procedures of EIA. Provisions of the law exclude public investment projects planned before 1993 from the compliance with EIA procedures. The exclusion weakens relative power of MOE to other branches of the Government, as almost all large-scale infrastructure development plans would be implemented without thorough environmental and social considerations.

Since the EIA regulation is rather new, there are problems in its implementation. While MOE is responsible for reviewing required EIAs prepared for proposed projects, budgetary arrangements and resources for the review process is not sufficient for ever increasing number of applications for the review process. In addition, MOE does not have effective enforcement measures. Monitoring and field inspection are difficult to implement because the ministry lacks resources to monitor day-to-day operations of approved projects nationwide. Thus necessary funds, as well as technical and personnel resources should be provided to enforce EIA at the field level.

According to the Turkey's EIA regulation, a certificate must be issued upon conclusion drawn from an EIA. MOE is responsible for issuing the certificate, but a 'Local Environmental Committee' whose members are experts in the relevant fields performs a technical review and makes decision to issue either 'positive' or 'negative' opinion of the EIA report. In many cases, the Government appoints the members of the committee. Community members are largely excluded from the appointment process. Between February 7, 1993 and November 30, 1998, MOE made 12 negative opinions out of 695 EIA applications.

(3) Lack of reliable baseline environmental data in the region

The DOKAP region lacks reliable baseline environmental data that can be used as a basis of rational investment decisions. Much of fauna, flora, marine ecosystem and birds, water quality etc are still unknown. A limited number of academic records and research conducted by different organizations and individuals are available, but their scope is inconsistent. Some research is narrow in scope or conducted within limited study areas. Lack of scientific data makes it difficult to manage natural resources of the DOKAP region for sound decision-making process.

The Black Sea Environment Program (BSEP) conducted and furnished a proto-type of environmental inventory to be used for the baseline of the action plan. It was based on collection and review of readily available data. Primary data were not collected because of the nature and urgency of the study. As the main focus of the BSEP was the Black Sea, many areas ecosystems other than marine ecosystem (flora, fauna, ground water, and birds etc.) were not covered.

(4) Lack of awareness and positive self-image to DOKAP environment

As stated in the following subsections, environment in the DOKAP region is largely disregarded. These phenomena were caused by a general neglect of surrounding environments over so-called 'economic advancement'. In reality, unsustainable use of resources seems to exceed an acceptable limit and pace. Pollution is already becoming a serious public health concern. Public, in general, lacks an awareness that the majority of pollutants come from domestic sources, and that individuals are both part of the problem and the solution.

There seems to be a contradiction between residents' strong affection to the region and lack of concrete actions to protect the environment. The public expects governments to solve all kinds of problems. There is even a sense of apathy and

powerlessness among the public toward solving environmental problems by taking concrete actions.

(5) Insufficient involvement of local communities and NGOs

Most public investment decisions are done in Ankara. Much of the work undertaken by regional governmental offices is to convey orders and directions from the Central Government. Central Government officials overlook contributions from local governments' authorities. Because of recent changes happening in domestic and international politics surrounding Turkey, public participation in decision-making has been much stressed as political fads. There are some signs of change to allow selected members from communities (such as representatives from business groups, or members of academia) in the planning and decision-making process. These are, however, mostly appointed by the Government and are examples of "functional participation", and much broader public involvement is expected.

3.1.3 Goals and objectives of DOKAP environmental sector

In line with the overall goals of DOKAP regional development, the goals of environmental sector in the study can be envisioned as follows:

- Integration of environment and economic value;
- Enhancement of social accountability that can enhance overall environment of the region; and
- Emphasis on local self-reliance.

According to the DOKAP regional development, the characterizations of each phase are defined as follows (see Table 3.2). In Phase 1 (2001 – 2005), the DOKAP region should establish community-based environmental management system. The system includes forest/watershed management, enforcement of EIA with open information system and information exchange on the Black Sea environment.

In the second phase of the plan (2006 – 2010), communities in the DOKAP region should become involved in EIA process, and environmental management and evaluation. Environmental information should be shared and exchanged through development of eco-community network. Establishment of a Black Sea environmental inventory as a baseline supports these activities. In the final phase (2011 -) the regional environmental management system should be upgraded and linked to the rest of the world.

In order to achieve these common goals for DOKAP environmental sector development, proposed strategies should be within the following framework:

- The strategy that supports a rational (investment) decision;
- The strategy that should enhance decisions supported by (scientifically) rational data;
- The strategy that provides an adequate legal framework and law enforcement;
- The strategy that builds awareness among the public on the environment, communal values, inter-dependency to outside world etc.; and
- The strategy that supports revitalization of traditional knowledge, etc.

Table 3.2 Characterizations on DOKAP Regional Development Scenario (Summary)

	Phase 1 **2001 – 2005**	**Phase 2** **2006 – 2010**	**Phase 3** **2011 –**
Economic domain	Preparation for economic re-structuring	Economic re-structuring	Sustainable economic growth
Social domain	Establishment of local foundation for social development	Extension of improved social services throughout DOKAP	Upgrading of social services network linked to other countries supported by multi-media telecommunication system
Environmental domain	Establishment of community-based environmental management system	Broadening of environmental management system	Upgrading of environmental management system linked to the rest of the world

Source: DOKAP Master Plan

The strategies developed should be selected using the framework in order to achieve the common goals of DOKAP environmental sector. Figure 3.1 provides the image of common goals of the environmental sector.

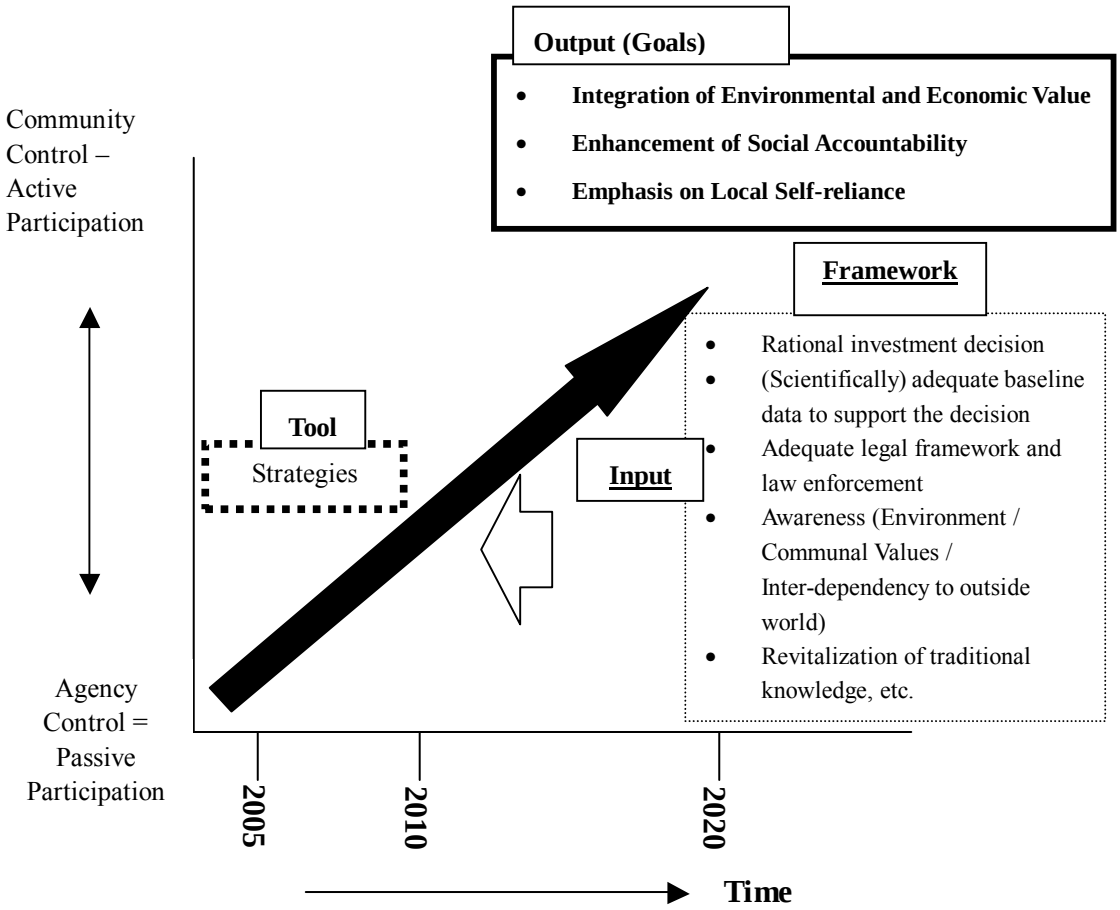


Figure 3.1 Common Goals of Environmental Sector (Image)

3.1.4 Overall strategy of environmental sector

(1) Decenterization and capacity building of local officials

The current management system no longer serves local communities effectively as centralized decision no longer meets local needs, nor effectively utilizes local resources. Much efforts of decenterization of administrative power are needed in order to eliminate many overlapping programs and projects. If municipalities and provincial governments plan and implement programs and projects on their own, a significant number of them should be better coordinated and waste of resources should be minimized.

(2) Increased accountability of environmental impact assessment (EIA)

EIA should be made more accountable. The current procedure is not fully inclusive to reflect a wide range of stakeholders including local communities and local and international NGOs.

The current application procedures of EIA do not require disclosure of information to include widely varied opinions for large-scale investment projects that may affect the environment. The public should have access to application documents easily during certain duration of EIA procedure. Public hearings should be institutionalized in the procedure. It should be strongly recommended to include a referendum to decide a proposed project benefit for public welfare by local community.

Local governments should form a regional planning committee to oversee and monitor all aspects of land-related development. Naturally, this proposed committee should be responsible for the EIA procedure. Appointment of the committee members should be democratic in order to maintain neutral stance of the committee. In order to finance the procedure, costs involved in EIA review, application and monitoring should be paid by the applicant. By providing training to local officials to increase capacity for managing EIA, MOE should transfer the power to oversee the EIA procedure. When these measures are implemented, accountability of EIA should be much improved.

(3) Black Sea environmental inventory

Accurate baseline environmental data constitute an important foundation of decision-making process. Current data covered in the DOKAP region are not reliable and comprehensive enough to provide baseline for decision-making process. The Black Sea Environment Program (BSEP) conducted and furnished a proto-type of environmental inventory to be used for the baseline of the action plan. The study was based on secondary data collection because of urgency and the scope of the program. Different institutions collected their primary data in different times. Therefore, the inventory should be updated, improved and, if necessary, renewed by conducting limited primary data collection.

(4) Partnership with local communities and NGOs in resources planning and management

In line with the overall goals of the DOKAP regional development, the participatory process should be more open and autonomous. Local government can undertake many field activities of public services in partnership with local communities, and NGOs. Such a participatory approach, in effect, creates stronger ownership, and sustainability, and is more rational. Ecosystem-specific strategies are explained in more detail in the following sections.

As mentioned in Chapter 2, the potential role of NGOs and the private sector should be increased in Turkish society. The traditional role of Government as a sole provider of public welfare is no longer appropriate because of many constraints, such as finance and man-power capacity. Given changing societal values toward more open and democratic ones, there is a need to develop mechanisms to assist all levels of government develop partnerships with NGOs, the private sector and local communities.

(5) Emphasis on environmental education to youth

Practical education should be more emphasized in the DOKAP program in order to raise public environmental awareness particularly for youth. Environmental education should be field-based as conventional education was ineffective for raising awareness. Three activities can be proposed to accelerate the efforts: 1) emphasis on field-based practical learning-linked internship which grants credits; 2) a government guaranteed educational loan program that requires community-based environment-related services for repayment during the study; and 3) tuition waiver program linked to an option of up to two years of community-based conservation activities (establishment of DOKAP conservation program) as a part of value creation.

1) Emphasis on field-based practical learning-linked internship which grants credits

As a part of the proposed value development in the program, practical, field-based environmental education should be much emphasized. In particular, higher education should employ internship as an effective tool to expose students to 'real world' experiences as an option to degree (or diploma) requirements. Official credits should be granted to the internship experience under instructors' supervision. Such practical experiences provide students opportunities to integrate knowledge in the classroom and concrete field experience in subject matters, and eventually foster much needed entrepreneurship.

2) A government guaranteed educational loan program that requires community-based environment-related services for repayment during the study

A government-backed soft loan program should be granted to eligible students without guarantors or collateral. The Ministry of Education should provide a loan guarantee to private financial institutions to make loans

available to eligible students. Repayments should start as soon as students enroll in the program by working after hours and weekends (e.g. up to 20 hours per week during academic semesters) at designated public service institutions. Hourly wages should go directly to the loan repayments. The government should subsidize to ease interest rate. Ministry of Education should provide administrative services to run the program. Schools and local community services are encouraged to hire students on their operation.

3) Establishment of the DOKAP Service Corps

The DOKAP Service Program (DOKAP Service Corps) allows people of all ages (focusing on youth at the establishment of the program) and background to receive help paying for education and professional training in exchange for a year of community service. In return, all participants receive up to at least the amount equal to tuition per year of a grant toward tuition of higher education or vocational training. Participants are eligible for receiving government-guaranteed student loans to cover other costs associated with education and training.

The DOKAP Service Program proposes to provide opportunities for youth in the DOKAP region to engage in services that address the region's educational, public safety, environmental, and other human needs to achieve direct and demonstrable results and encourage all youth in the DOKAP region to engage in such services. The participant in the program involve in a local service organization operated by not-for-profit agencies, local and national governmental agencies, and institutions of higher education, local schools, and partnerships among any of the above. Existing scholarship programs should be much expanded in terms of numbers and amount given through a proposed program. Three activities can be proposed: 1) emphasis on practical education in higher education through granting credits to internship: 2) a federal loan program that requires community services for repayment during the study; and 3) tuition waiver program linked to an option to up-to two years of community services (Establishment of the DOKAP Service Corps).

3.2 Strategy for Forest Ecosystem

3.2.1 Constraints

The DOKAP region has most extensive forest areas in Turkey. In particular, three major mountain ranges of Soganli, Kaçkar, and Karcal and many valleys of the Çoruh and other rivers are noted for extensive forests and alpine habitats. The

Çoruh river valley is known for rich flora with exceptionally high endemism, where large mammals are also well represented. The sustainable conservation of the unique forest ecosystem of the DOKAP region through protected area planning, management and monitoring have been hindered by the following constraints.

(1) Lack of policy for globally most important mountain ecosystems

The DOKAP region has two important mountain ecosystems: the Kaçkar mountains including Firtina valley and the Karcal mountains. They are situated in the eco-region considered as one of "The Global 200" biologically outstanding eco-regions that deserve special attention (World Wide Fund for Nature in Switzerland, International Union for Conservation of Nature). However, the current environmental protection measures for conservation of these ecosystems are not sufficient and adequate for the ecosystems of the global significance.

For example, uncontrolled logging is a serious threat to the Karcal mountains ecosystem due to the lack of official conservation status. The Karcal mountains (25,000 ha: Rize) are located near the Georgian border and characterized by unique ecosystems and community compositions, and a large number of endemic species. Since the old-growth forests maintain good habitats for wildlife in the Karcal mountain area, with the advantage of the low human population, the area has very high potential to keep large mammals. Because of the close proximity to the border, and the security purpose, there have been few economic activities undertaken in the area. However, lack of effective protective status allows uncontrolled logging and road construction for exploitation and they are the most serious threats to the ecosystem of the Karcal mountains.

(2) Various economic activities in forest regime posing threats to the unique ecosystem.

The Dilik-Güroluk hydroelectric power plant has been planned in close proximity to the Kaçkar Mountain National Park (52,000ha: Rize). Related construction works (access roads, depot, and plants etc.) were started both inside and outside the National Park area of the Firtina valley (approx. 15,000 ha), which is located on the northern skirts of the National Park.

An EIA for the project (EIA, Process Number: B.19.O.ÇED.O.12.00.06/1555-5030; date: 26.06.1998) was prepared and it was evaluated by MOE. The EIA indicates that there will be no significant negative impacts related to the construction of the proposed hydroelectric plant project.

The project, however, was challenged through a lawsuit brought by citizen's groups claiming that the EIA did not address negative impacts associated with the project. The Trabzon Administrative Court concluded that MOE did not evaluate the EIA report properly (Trabzon Administrative Court file number 1998/963E and 1999/1197K, dated November 9, 1999). The court further found that EIA's scope was narrow in context, and that it did not sufficiently address negative impacts associated with the proposed project. As the result of the court decision, the construction is currently stopped, but the project is not completely abandoned because the defendant appealed to the Supreme Court.

Another example is seen at the Çamburnu Nature Reserve. It is located between Sürmene and Of and its area is 180 ha. It is regarded as one of the most beautiful scenic floras in the region, and a unique forest ecosystem for rare yellow pine exists at sea level. Many suggest the reserve has important tourism potential. The area is a Nature Reserve where the protection status is the highest in the national park system in Turkey.

Threat to the reserve is expansion of a coastal highway, particularly a tunnel construction project implemented under the reserve. Increased emission from the existing coastal highway is a potential threat to the unique ecosystem. Tunnel construction may have some negative impacts to the forest ecosystem, as the construction site is in close proximity to the reserve. Law does not apply EIA because the tunnel project was planned before 1993, and the area affected by the project is minimal. The most unique part of this forest ecosystem, however, is the area that is the site of the tunnel, and the construction may give serious negative impacts to the reserve. Increased air pollution and proposed tourism development at the buffer zone may harm the ecosystem. The tunnel construction is almost completed at the most unique part of the forest ecosystem without considering long-term effects by the project.

(3) Inefficient national park system and protected area status

The Ministry of Forestry (MOF) shares authority with other government offices for the management of the national park system in Turkey. The General Directorate of National Park, Game and Wildlife of MOF does not have sole authorities within the national park system.

In the Hatila National Park, for example, the Ministry of Culture (MOC) is responsible for designation and conservation of cultural heritage sites and natural features. Under the Law of Conservation of the Culture and Natural Object, MOC forms the Superior Committee for the Conservation of the Culture and Nature

Objects designate Natural Site Areas. The General Directorate of Rural Services Office of the Prime Minister can build rural infrastructure within a park area to provide services to rural communities. The Ministry of Public Works and Settlement can grant permission for construction of buildings (such as a hotel).

The coordination among different government agencies is superficial rather than substantial. No agency has sole authority to manage inside any national park boundaries.

Historically, national park management has been primarily focused on provision of recreational facilities for the public rather than the conservation of natural ecosystems and biodiversity. MOF still sees it as trees rather than part of the ecosystem extending beyond the system.

Current protection status categories in Turkey are not harmonized with internationally accepted IUCN categories for park management. The type of protection is slightly different in each status. For example, Wildlife Reserves only regulate hunting of game and wild animals. Timber extraction is still permitted in a forest area in a Wildlife Reserve. MOF accounts the reserve as a 'protected area' status, but under IUCN definition, it is considered as Wildness Area, which should be excluded from protected area.

Table 3.3 Comparisons of Protected Areas in the DOKAP Region

	Type of Protected Areas	Turkey		DOKAP Region	
		Total (ha)	(%)	Total	(%)
1	National Parks	649,486	25.0	77,124	79.1
2	Nature Reserves	82,023	3.2	2,387	2.4
3	Nature Parks	46,873	1.8	1,625	1.7
4	Natural Monuments	74	0.0	0	0.0
5	Subtotal (protected areas under N.P. law)	778,456	29.9	81,136	83.2
6	Wildlife Reserves	1,823,437	70.0	16,335	16.8
7	Total of Protected Areas	2,601,893	100.0	97,471	100.0
8	Total Land Area	77,945,200	-	3,936,100	-
	2/8		0.1		0.06
	5/8		1.0		2.1
	7/8		3.3		2.4

Source: Ministry of Forestry

Table 3.3 shows comparisons of protected areas in the DOKAP region to national figures. Currently, the total area of protected area under the National Park Law is 81,136 ha which is about 2.1% of the total DOKAP region area. This figure is twice the national average (1.0%). Given the restriction of the protected status, only nature reserve area is considered as 'protected land' status in IUCN category. Only 0.1% in national and 0.06% of the DOKAP region is classified as real protected land while OECD average of the same status accounts for 7.8%.

Considering the large share (26% of total area) of forest area in the DOKAP region, protected areas under the National Park Law could be much larger in order to protect biodiversity of the ecosystem of the region.

(4) Overlapping responsibilities for protected area planning within GDNPGW

At the headquarters level, two separate departments of GDNPGW (the Departments of National Parks, and Game and Wildlife) and five different divisions under these departments (National Parks; Protected Areas; Wildlife Protection; Game Breeding and Management, and Fisheries) are responsible for the supervision of management of eight different categories of protected area (National Park; Nature Reserve; Nature Park; Natural Monument; Wildlife Breeding Station; Wildlife Reserve; Wildlife Settlement Area, and Fisheries Rehabilitation Sites). Each division currently has separate responsibility for preparation of their own management plans, survey and inventory of sites, and data management (Chapter 2).

(5) Lack of coordination for forest management

Outside the mountain ecosystems mentioned above, there are a few areas that maintain equally important old growth forests. They are categorized generally as "productive forests" in their management plans to allow exploitation. According to Turkey's forest management standard, productive forests are defined by age, species and tree cover. In practice, Old Growth Forest has higher economic values, as it is mature, large and untouched compared with younger and degraded forests.

While the introduction of high growth species such as Alder eases the pressure to such old growth forests, they are still under threat of exploitation to meet timber demand as there exist no comprehensive forest management plans. Four General Directorates of the Ministry of Forestry have separate management plans for production, protection, afforestation and serving forest villages. Coordination between these entities is superficial. There are many protected areas managed by MOF outside forest areas, and no inventory study exists.

(6) Limited capacities for field and central level staff of MOF

Limited staff and financial capacities of MOF regional offices work as a constraint to management. While the number of protected areas whose management is the responsibility of the Department of National Parks (i.e. national parks, nature reserves, nature parks, and natural monuments) has been increased from 41 to 128 between 1990 and 1994 (from 355,000 ha - 740,000 ha), resources allocated for management of these four categories of protected area

have decreased in real terms during the same period (United States Embassy in Ankara). Furthermore, some of the new sites that have been acquired by the Department of National Parks include wetland areas where new technical skills will be needed by field and central level staff to enable them to manage the environmental and biological integrity of the sites. As a result of increasing population pressure on all Turkish natural resources it becomes increasingly important to address the needs of local communities in protected area planning and management. For example, partnership with forest communities, and development and marketing of community-based non-wood products resource management require knowledge and skills outside the conventional forest management.

3.2.2 Objectives

To achieve the overall goals of the DOKAP regional development, the following three objectives are defined.

By the year 2020, the DOKAP region will be able to:

(1) achieve viable regional economy through development and diversification of non-timber products for increased income opportunities and meeting local consumption;

(2) promote equitable forest resource utilization through public involvement in integrated forest resources management and decision making process; and

(3) conserve globally unique ecosystems for future generations in line with Turkey's National Biodiversity Conservation Strategy and Action Plan.

3.2.3 Strategy

(1) Prerequisite

To improve the management of valuable forest ecosystems in the DOKAP region, values of the forest ecosystem as a whole needs to be much appreciated.

The most fundamental reason for unsustainable use of forest ecosystems in the DOKAP region is that benefits derived from them do not accrue to the beneficiaries of the forest ecosystems. Prices for some of the goods and services of forests are not accurately reflected in the cost and benefit of timber production. For example, price of water supply services is not a reflection of timber products. Planners of forest activities underestimate the value of the forest ecosystem mainly because the price of timber does not account for such values as

non-timber products, carbon storage, pharmaceutical, ecotourism/recreation, watershed protection, non-use value, and option value.

Table 3.4 shows some examples of realized market value and possible non-market value in goods and services delivered from forests. Many forest activities with market value also have non-market value.

Table 3.4 Comparisons of Forest Activities and Market Value

Examples of Forest Activities	Market Value Realized	Non-market Value Existing
Timber	○	X
Non-timber products[1]	○	○
Carbon storage	X	○
Pharmaceutical	X	○
Ecotourism/recreation	○	○
Watershed protection	X	○
Non-use value[2]	X	○
Option value[3]	X	○

○: Yes, X: No

Although it brings drastic changes to the views toward mountain ecosystems of Turkey as a whole, the values of the ecosystem should be carefully re-evaluated from the viewpoint of environmental economists.

(2) Carbon sequestration and DOKAP forest ecosystems

The UN Framework Convention on Climate Change (FCCC) attempts to create markets for non-market services of forests and sanctions activities. The market is to establish a mechanism to offset carbon dioxide and other green house effects gas. Regardless of the proposed and expected change in the status of Turkey in the Kyoto Protocol, the market for carbon sequestration service seems promising. If the protocol is fully implemented, and if strategically utilized, current non-market value of the forest ecosystem in the DOKAP region should be realized.

Currently MOE has taken the initiative to investigate carbon dioxide sequestration in relation to the FCCC. Although it is still too early to assess their effective impacts, it is important for Turkey to further investigate whether these schemes will be applicable in the forest ecosystem of the DOKAP region.

[1] Non-timber products refer to resins, nuts, mushrooms, wildlife and other forest products, some of which have market values.

[2] Non-use value includes those attached to forests by people even if they will not use these forest resources. Some examples include aesthetics and source for oxygen.

[3] Option values relate to the non-market value of preserving forests for future use.

While the demand is high for putting in place an efficient system of financial transfers to make sure that payment from carbon emitters reaches the State as the forest operator, operational measures need to be devised. Various initiatives are now under way to implement mechanisms for demonstrating values and creating carbon markets. MOE should take much stronger initiatives to collaborate closely with MOF to study the matter.

(3) Updating and upgrading resources inventory

Reliable statistics of the forest industry are not available in Turkey. The last statistical survey of Turkish forests was conducted in 1981, which has been partially updated in every five years. The inventory, however, utilizes conventional methods such as estimation from forestry maps and statistical methods. This inventory should be fully updated using scientific methods and advanced technology. Estimation of volume, species and tree cover could be accurately made using remote sensing technologies supported also by a GPS (Global Positioning System) and a GIS (Geographic Information System). Improved inventory would be the basis of sound and sustainable forest management. These technologies are effective to identify spatial distribution of forest resources by type and maturity.

The forest ecosystem in the DOKAP region contains vast reserves of genetic resources that may be utilized for pharmaceutical, dietetic, and other purposes. In order to improve the forest resource inventory of the region, use of plant ecology should be widely implemented. Bioprospecting should be conducted to collect and catalogue plant species including fungus. Indigenous knowledge and use of plants should also be covered to appreciate the real value of the forest ecosystem.

(4) Developing comprehensive forest management plans

Current management plans, developed separately by four different general directorates should be integrated into one comprehensive management plan through coordinated efforts. The ecosystem conservation point of view should be incorporated in such plans. The planning process should involve participation of all the stakeholders including forest villages so that actions can be taken more effectively based on the plans.

(5) Applying collaborative approach in forest management

Tables 1 to 3 of Appendix 6 show levels of community-based collaborative forest management approaches. They also show summary of benefits and examples of necessary arrangements provided by MOF.

The new management plan proposed above should start with re-evaluating the current relationship between MOF and stakeholders. MOF has recognized forest villagers as important stakeholders. The relationship between the ministry and villagers, however, did not exceed beyond 'Information Giving' and 'Passive Participation'. Current forest management approaches largely exclude forest villagers in major decision-making processes. Forestry policies and management decisions have been considered as a sole responsibility of MOF. With some exceptions, such as the Forest Village Program (ORKOY), almost all decisions are made by MOF without consulting with villagers.

In the proposed forest management approach for the DOKAP regional development, the power of managing the forest resources should be redistributed in steps to forest villagers under the guidance of MOF and local governments. The process should start now and gradually transfer the power to forest villagers by the end of 2020.

(6) Extending faculties of the Black Sea Technical University

To expand the human resource base for the management of forest ecosystem effectively, existing programs and faculties should be much strengthened at the Black Sea Technical University. Specialized fields/facilities include plant biology, conservation biology extending marine science and forestry departments; some of them may become independent departments in the future.

(7) Generic Resource Center

A new national-level plant genetic research program should be established in the DOKAP region. There are a few existing plant-based genetic resources center (gene banks) programs run by different ministries in Turkey. For example, the Ministry of Agriculture and Rural Affairs (MARA) has the Plant Genetic Resources Research Institute (PGRRI) that has the largest collection of wild species in Turkey. MARA also maintains the Field Crop Research Institute (FCRI). These collections have been developed from ecogeographic purpose of the collection mission. They are, however, primarily weighted toward those from the western half of the Country (Table 3.5).

The proposed Genetic Resources Center focuses on gene resources originated from the eastern part of the Country. The center undertakes integrated conservation approaches by covering both agricultural and forestry plant genetic resources, as well as in-situ and ex-situ conservation methodologies, which are unprecedented in the Country.

The new center is intended as a pilot program for strategic use and management of Turkey's genetic resources by three related ministries: Ministry of Agriculture and Rural Affairs (MARA), Ministry of Forestry (MOF), and Ministry of Environment (MOE). Initially, the center is established as an independent research institute associated with PGRRI of MARA with joint initiatives of MOF and MOE. MOF provides much resources and expertise in the region, as the majority of plant resources requiring conservation in the region exist within the forest regime.

Because of increasing threats to biodiversity in the region, the center should be established in the nearest future, and it should merge and be integrated with the Forest Trees and Seed Improvement Institute (FTSII) of MOF, the PGRRI and MARA's other programs with similar mission by 2010. The merger should create the national center for a gene resources database which could effectively serve for strategic use and management of genetic resources in Turkey.

The activities of the proposed gene resource center should include the following.

- Site selection and inventory to collect site-specific baseline data to support integrated conservation management planning, field implementation and monitoring. Surveys would be followed by review of existing research data collected by the Forestry Research Institute of MOF in Trabzon and KTU. Site selection should cover the entire seven provinces, and not be limited to existing protected areas.
- Installment of information system and development of the Black Sea Genetic Resource Database that could eventually expand to the national database.
- Policy research – with collaboration of three ministries, the legal framework for biodiversity conservation and use of genetic resources including procedure and mechanism to initiate equitable bioprospecting that will benefit local communities. An action plan for the proposed merger and integration of other gene bank programs is developed.
- Development of appropriate economic initiatives which involve demonstration of site specific socioeconomic development initiatives that provide a link between biodiversity conservation and economic benefits for local communities.
- Capacity building - within key government agencies and NGOs involved in project implementation at both the field and central levels. This could involve a preliminary institutional needs assessment followed by reorganization, participatory planning by objective and implementation of long-term staff development and training to support and consolidate biodiversity conservation throughout the region. Further support from specialists of

Organizational Development is provided for the proposed merger of gene bank programs.

- Public awareness and education - including the establishment of mechanisms for the involvement of local community based organizations, links with local, national and international media, and provision of facilities for site interpretation for visitors.

Table 3.5 Existing Gene Resources Conservation Programs in Turkey

Program	Type of Collection	In-situ Conservation Program	Ex-situ Conservation Program
Plant Genetic Resource Research Institute (PGRRI), Ministry of Agriculture and Rural Affairs (MARA)	Agriculture	○ (Western Turkey)	○
Aegean Agricultural Research Institute, Ministry of Agriculture and Rural Affairs	Agriculture	○ (Aegean region)	×
Field Crops Research Institute (FCRI), Ministry of Agriculture and Rural Affairs (MARA)	Agriculture		○ (Primarily backup for PGRRI)
Osman Tosun Gene Bank, Faculty of Field Crops, Ankara University (Historical collection of Jack Harlan and Osman Tosun)	Agriculture	×	○ (Not all are duplicated at PGRRI)
Conservation through Protected Areas (N.P's, Gene Conservation Areas, and Seed Stands)	Forestry	○	○
Forest Trees and Seed Improvement Institute (Ministry of Forestry)	Forestry	○	○
Seed Collection at Regional Directorates of Ministry of Forestry	Forestry	×	○
Specially Protected Areas (Ministry of Environment)	(Outside Forest regime)	○	×
GEF (The World Bank and UNDP)	Agricultural and Forest	○ (Aegean Northwest, Southeastern Turkey, Southeast Anatolia, and Southern Anatolia)	×
GEF (The World Bank and UNDP)	Forest	○	×

○: covered, ×: not covered

Source: Ministry of Agriculture, Ministry of Forestry, Ministry of Environment, and The World Bank

(8) Reforming protected area management system

To improve the current land protection in Turkey, a new protected area management system may be introduced. The following are important elements of the reform.

1) More effective land use control in protected areas

Outside the national park system, there is little mechanism to protect inside the forest regime. Protected land should be extended outside the national park system based on existing land use and land capability as well as natural resources to be protected or managed. The criteria for protected areas should be defined closely related to suitability of land such as significance of biodiversity, terrain, watershed management, preventing erosion and other reasons. In Japan, there are 17 categories in reserved forest for public safety. Criteria for protected forest should be much extended in order to protect water resources and to reduce vulnerability against natural disasters. Additional categories may be introduced and applied inside and outside the forest areas.

For example, a steep slope with a landslide or avalanche risk should be designated as protected area for public safety. It should be an area where activities other than protecting the land are strictly prohibited. If it is private land, it should be state-owned or exempt from property tax. As an incentive for the owner to protect the land, if necessary, additional protective measures should be provided at the government's cost.

2) Redefining protective status in National Park Law

In the current national park system there is only one category in the protection status (Nature Reserve) in IUCN's internationally recognized classification. Even in a Nature Reserve, certain level of development and land utilization related to the park activities is permitted. The National Park Law defines three distinctive zones: core, buffer, and development. The definition, restrictions and activities permitted within classes of zoning in a protective status are shown in Table 3.6.

Table 3.6 Zoning in the Protected Areas

Zones	Description
Core Zone (Zone I)	For absolute protection Areas with highest biological, physical, archeological and historical value. Applies only on State-owned lands Some facilities and human interventions for protection, maintenance, research and restoration permitted
Buffer Zone (Zone II)	For transition to development zone and outside-park activities Areas to protect the Core Zone (Zone I) Minimum human activities (such as agriculture, animal husbandry and forestry) are permitted as described in the master plan
Development Zone (Zone III)	Development (tourism, settlement etc…) is permitted. Human activities in the Development Zone are permitted if they are listed in the park management plan.

Protected status as well as such zoning should be better designated based on more scientific data utilizing technologies such as a GIS. Further, such designation should be decided as an element of the National Park Master Plan in the next subsection.

3) Preparation of National Park Master Plan

The National Park Law requires MOF to furnish each park with a "National Park Long Period Development Plans" (Master plans: scale of 1:5,000). The plan provides guidelines for management of the park system.

In 1972, the United States Agency for International Development (USAID) provided a technical cooperation to prepare a national park management plan, which eventually developed into the first national park master plan of Turkey. It is, however, only furnished in limited number of protected lands in Turkey. Budgetary constraints prevented to develop additional national park master plans in Turkey since then. In the DOKAP region, no protected areas have a master plan. A new master plan should be prepared based on the upgraded forest resources inventory to be prepared by scientific methods. The new master plan should effectively employ local resources, such as personnel and their local knowledge in forest ecosystems in the DOKAP region.

4) Establishment of "Park Ranger"

There is a need for one coordinated authority to oversee development within the national park area. After redefining protected areas, the state power to manage protected areas other than the national park system should be transferred to the proposed DOKAP agency or regional office of MOF. This transfer of power would increase efficiency of the forest management that directly contributes to disaster readiness of the region. The General Directorate of National Parks should be reformed into a more area-specific office that may be called a "Park Ranger". Ideally, it should be an independent agency under the Prime Ministry, transferring responsibilities for managing the national park system from MOF regional directorates.

5) Coordination of different ministries for protected area management

The national park system should be a part of broader forest management plan. At present, three other ministries have authority, other than the General

Directorate of MOF, for different aspects of National Park management: the Ministry of Culture for cultural sites, the General Directorate of Rural Services for rural infrastructure within the park boundaries, and the Ministry of Public Works and Settlements for issuing permission to construct buildings. These offices should be coordinated under the proposed Park Ranger. Proposed comprehensive management plans described earlier prepared through coordinating efforts of related government offices, and related human resources need to be developed to enforce effective management.

3.3 Marine Ecosystem

3.3.1 Constraints

(1) General neglect of marine ecosystem without priority

The marine ecosystem of the Black Sea has been largely neglected. Limited shallow waters of the Black Sea provide breeding areas for many species, but tend to be subject to reclamation. Protecting the marine ecosystem of the Black Sea is not a priority in the face of urbanization along the coast and need to expand infrastructure capacities. The Black Sea coast has been reclaimed extensively for various urban uses. In addition to continual widening of the coastal road, planned use of reclaimed land includes the new Ordu-Giresun airport at Gulyali and an organized industrial zone in Rize.

(2) Pollution by municipalities

The sea is seen as receiving water body for discharge of municipal wastewater and dumping ground of solid wastes. In coastal municipalities, sewage from most households is collected and discharged to the Black Sea without treatment. Rapid tourism investment and development, encouraged by legislation, have generated wastes and degraded the groundwater, agricultural land, and cultural/ historical resources.

Sewage from the provincial centers is discharged typically with some 1,000 m long sewage pipe at the depth of some 30 m from the sea surface. The city of Trabzon contributes to the largest amount of loads for BODs, TSS and total – nitrogen, followed by Giresun, Ordu and Rize in this order. For total-phosphorus, the city of Ordu tops other coastal municipalities, followed by Trabzon, Giresun and Rize (Black Sea Transboundary Diagnostic Analysis). All four provincial centers along the coast use the Black Sea as main disposal sites for their solid wastes.

(3) Lack of scientific data on marine ecosystem

Lack of reliable data on the Black Sea environment makes its management difficult. The Black Sea offers a unique marine ecosystem, which is not well known. It is an inland sea with only one narrow outlet at the Bosphorus Channel, but is drained into by the second, third, and fourth largest rivers in Europe. Its morphology due to complex geological formations creates a wide range of oceanographic, meteorological and ecological phenomena. The lack of scientific data on such phenomena makes the management of the Black Sea ecosystem difficult.

(4) No single authority in charge of overall management

Many government offices and agencies are concerned in the development and management of coastal areas and use of marine resources. Yet, there is no single authority in charge of overall management of the Black Sea ecosystem. Moreover, the catchment area of the Black Sea is shared by seventeen countries, among which cooperation for the use and management of these common resources has been on the agenda only recently.

Economic and population growth is not managed in a way that effectively controls the effects of industrial and domestic waste discharges, housing development, road construction, and land reclamation on the coastal zones. Wastewater discharges due to accidents and spills, the disposal of solid waste at sea, and environmentally insensitive port and marine developments threaten marine resources. Finally, fishing practices and over-fishing are unsustainable for the Black Sea marine ecosystem.

3.3.2 Development objectives

Objectives of DOKAP with regard to marine ecosystem are established as follows:

(1) To improve quality of the Black Sea water regime to be utilized as common amenity of the DOKAP region;

(2) To implement sustainable resource management supported by scientific data; and

(3) To increase public involvement in planning process, resource use, and decision-making.

3.3.3 Strategy

Given the constraints described above, the proper management of the Black Sea ecosystem is a long-term issue. Measures to alleviate more serious problems need to be initiated in the immediate future in such a way to develop improved overall management of the ecosystem in the long run. Clarifying priority policies, establishing institutional mechanism to get all the stakeholders together, preparing a common base for discussions among the stakeholders with best available data, and human resources development constitute the strategy.

(1) Comprehensive coastal management planning

Preparation of a comprehensive coastal management plan would be instrumental to manage various economic activities and uncontrolled growth more effectively. Preparation process of the plan for the Black Sea will create a forum for all the stakeholders to get together and discuss various issues related to the Black Sea ecosystem. The process should involve local communities more widely in planning and implementing various investment programs.

This joint activity may prove to be the first step to establishing a management entity for the Black Sea marine ecosystem, preferably with the local initiative in cooperation with the Central Government. Local people should be involved in the planning and also in operation of the management entity for monitoring and other activities. Priority policies should be clarified, and the management plan should be prepared through the participation of all stakeholders. The plan should cover reclamation, beach protection, and improvement of waterfront aesthetics as well as use and management of coastal and marine resources. An open information system would be a key for the success of this entire process.

The management plan should include prevention measures for pollution and risks from maritime transport, strict enforcement of safety and pollution control regulations, and better monitoring and development of emergency preparedness systems for Black Sea waterways.

Finally, the plan should address sustainable fishery management through less-destructive fishing techniques, impose regional fishing quotas linked to the sustainability of the stock, involve fishermen in decision-making, and implement the water resource and pollution control measures mentioned above.

This program should incorporate the proposed Black Sea Environment Action Plan (BSEAP). To do this, it should first evaluate the BSEAP's ongoing activities and outcomes. In particular, it should look into progress of the projects proposed in the BSEAP.

(2) Local alliances for wastewater treatment and solid waste management

The magnitude and urgency of the problem in marine ecosystem in the DOKAP region is at crisis point. Waste water and solid waste treatment facilities are urgently needed to improve overall quality of the DOKAP marine ecosystem. Wastewater treatment plants need to be established in steps and solid waste management practices improved for larger urban centers along the coast. Given limited financial and staff capacities of most municipalities, alliances of local governments should be promoted for cost-effective provision of these facilities.

The Global Environmental Facility (GEF) of the World Bank conducted a study on possible construction of a solid waste management facility for Rize and Trabzon. A parcel of land is proposed between Rize and Trabzon provinces. It is, however, suspended because of environmental concerns by local community in Surmene. A mediator is needed and information needs to be disclosed if the two provinces are serious enough to build the solid waste disposal site in the proposed area. The growing sentiments of NIMBY (Not In My Back Yard) are inevitable in Turkey as the democratic process gains more support and power. Implementation of any measure for difficult issues, such as this, should include broader participation by providing accurate information and possible alternatives. Such dialogue may take much longer to resolve the issues. However, much evidences suggests that disclosure of information and participatory decision making help to sustain agreements in the long run.

(3) Black Sea environmental inventory

The Black Sea Environmental Action Plan prepared a prototype of marine ecosystem inventory. The study was based on secondary data. To provide a more concrete baseline for decision-making process, concerted efforts should be made to prepare a common database that can be used for discussion on issues. It should also be used for preparation of the proposed coastal management plan, and reference for monitoring. The inventory should represent the best available data, but it should be initiated to collect more scientific data using advanced methods. Implementing agencies should include NGOs, particularly DHKD that has significant scientific field data as well as research capacities.

(4) Extending faculties of KTU

For the management of marine ecosystem, human resources development holds a key. The existing marine science department at the Black Sea Technical University may be extended with new programs, and new faculties may also be

created. Oceanography, maritime engineering including hydraulic simulation, and water quality modeling may be among the subjects to be considered for new faculties. This will involve protecting marine and coastal ecosystems, using EIAs more widely for coastal development, and reforming institutions to better implement existing measures.

3.4 Urban Environment

3.4.1 Constraints

(1) Black Sea seen as constraint rather than opportunities

Most urban centers in the DOKAP region are located along the Black Sea coast, but most people and government officials tend to see the Black Sea not as an important part of the urban environment but rather as a factor constraining urban development. The Black Sea provides, in fact, dumping area for solid wastes and discharge sink for wastewater. This perception itself is a constraint to improving urban environment.

(2) Lack of urban amenity

The harsh topography of the DOKAP region forces urban centers to develop along the narrow strips of coastal land, in river valleys, and on top of mountains. Conversely, urban environment in the region can effectively utilize magnificent landscapes ranging from alpine mountains to the Black Sea coast as important elements of urban amenity. In reality, however, Artvin commanding mountain views generally lacks adequate urban facilities, and coastal towns see the Black Sea as a constraint as mentioned above. Within urbanized areas, mixed land use is commonly observed, undermining the amenity as well as the efficiency provided by various urban facilities.

(3) Lack of effective urban land use plans

Despite the legal mandate, most municipalities do not have land use plans that can be used to guide and control urban land uses effectively. In the DOKAP region, however, even provincial centers do not have sufficient staff in the urban planning and development section.

(4) Degrading social environment in urban areas

Following the collapse of the cold war structure, the DOKAP region has received a large influx of people from neighboring countries. Most of them have moved into larger centers, mainly Trabzon and Artvin. While they contribute to the local

economy through various transactions, they have also brought changes in social environment including some negative impacts.

(5) Declined urban air quality

While past measures affecting fuel use for industrial and heating purposes helped improve urban air quality, air pollution from motor vehicles is a persistent and growing problem, especially in cities with high population densities. Relatively low efficiency of energy use by industries, transport, and households results in higher consumption of energy resources and higher levels of pollution.

Also, fuel pricing is not consistently applied to control the use of polluting fuels. Unleaded fuel is sold at about the same price as premium leaded fuel, so consumers have no incentive to switch.

Monitoring of urban air pollution is not reliable, since the number of data collection points in major cities is limited (only two for Adana and nine for Istanbul); also, the points change from year to year, not allowing comparisons over time. Data on lead level and indoor air pollution are inconsistent at most monitoring sites. Studies on health effects and economic costs are still not yet developed.

3.4.2 Development objectives

Objectives of the DOKAP urban environmental development are established as follows:

(1) To improve urban amenity by promoting and encouraging private investments;

(2) To provide incentives such as tax breaks, public investment and rational legal framework, for private investors to encourage such investment decisions; and

(3) To strengthen administrative and planning capacity to be able to manage proposed growth.

3.4.3 Strategy

(1) Preparation of waterfront development plans

As the first step toward changing the negative perception of the Black Sea for urbanization, major urban centers in the Black Sea coast should prepare waterfront development plans. Such plans should incorporate the Black Sea and its coast as important part of urban environment. While continued land

reclamation is inevitable to some extent, to expand the capacity of urban infrastructure, access to beaches should be warranted in the plans selectively.

As part of the DOKAP Master Plan Study, current land use, land use suitability, and zoning were analyzed utilizing GIS technology. Conversion of land use should be strictly controlled and limited to the reserved area designated for planned population growth in line with the DOKAP objectives.

Such processes need to be democratic and accountable, therefore a regional planning committee should be formed. The committee may initially consist of appointed civilians whose expertise should include: urban planning, architecture, economics, agriculture, and forestry. The committee works as a council to advise the local government various land use issues from an objective point of view. It should eventually turn into an elected body.

Also a legal framework for public hearings and referenda processes for large investment plans should be established. Currently there seems to be no mechanism to obtain inputs and opinions from local population. Large investment projects often suddenly start without the knowledge of local communities. In order to achieve a truly 'open society' by 2020 as the DOKAP envisions, statures of public hearings and referenda should be established.

Private investors following the guidelines established by the master plan should receive various incentives through tax break for the investment (such as acceleration of depreciation on the book etc.) and easement to the building code (i.e. providing more floor areas.)

Use-fees for various urban services (such as school, sewerage, solid waste collection, and drinking water) should be examined in relation to the program. If necessary, to finance the services, the beneficiaries should directly contribute to the local governments' account in exchange for the permission to the project. Alternatively, the beneficiaries should construct certain urban infrastructure in lieu of the permission. This may eventually discourage migration to certain urban centers because of increased living costs in the urban center.

(2) Provision of core urban areas/facilities

As a step toward enhancing urban amenity in larger urban centers, urban renewal or redevelopment may be undertaken to create areas for core urban facilities. Existing mixed land use areas may be used for the purpose, or relocation of factories and workshops to suburbs may provide opportunities for the urban renewal. Core urban facilities may include some high-grade facilities and amenity such as cultural and sporting facilities and shopping arcades.

(3) Encouragement of "coopetition" among municipalities

As mentioned in the previous subsection, alliances of local governments should be encouraged to improve various urban infrastructure facilities in a more cost-effective way. More broadly, "coopetition" or cooperative competition should be encouraged among municipalities for improvement of urban environment. Various urban facilities in different municipalities should be developed in a mutually complementary way in line with the urban hierarchy with functional division. Larger urban centers may compete with each other for the provision of high grade urban facilities of different kinds so that each will develop definite characters which will complement one another to attract more visitors to the DOKAP region as a whole.

Another way to encourage "coopetition" is for the Central Government to introduce additional criteria for allocating fund to finance infrastructure needs, depending on performance of local municipalities in compliance of various environmental regulations. This may be applied to the Municipality Fund and other centrally controlled grants.

(4) Use of high quality energy resources and improvement of air quality

Municipalities and local governments of the DOKAP region should encourage residents wider use of natural gas and high quality coal. Because of relatively high cost of high quality energy resource over low quality coal, financing mechanisms for poor households to pay for coal to gas conversion should be developed.

For motor vehicles, local governments should promote and accelerate the program to promote wider use of lead-free gasoline and through fuel pricing, domestic production of suitable vehicles, import controls, and public awareness. Such measures should reduce heavy emission of greenhouse gases utilizing market forces.

Pollution control and environmental management should be encouraged and enforced by market forces rather than a regulatory approach. Adopting least-cost energy planning, integrating environmental costs and benefits, to determine the nature and scope of new energy investments would be effective for energy producers, especially power plants and the mining sector.

(5) Improving public transport system

The DOKAP region has a network of public and private mass transport systems. In order to improve air quality of the urban environment, the public transportation system should be improved by taking various measures. Tax incentives for

operators, preferred pricing or tax refund for gasoline, restriction and tight traffic control of private car users may discourage use of private cars.

3.5 Rural Environment

3.5.1 Constraints

(1) Depopulation of rural settlements

Living environment of rural settlements tends to be neglected as a result of out-migration and depopulation. Some seasonal settlements have been degraded by lack of attention due to changing lifestyle and social habits.

(2) Forest villages

It is reported "there are 473 officially designated forest villages in the forest areas with 6,000 households in Ordu and Giresun alone" (Ordu-Giresun Rural Development Project, Appraisal Report, October 1995). They are located generally within the altitude range of 700 – 1,600 m. While some of them harvest some aromatic and medicinal plants, mushrooms and other forest products on a sustainable basis, others sometimes open additional forest areas for cultivation and grazing as well.

(3) Improper management of grazing land

Rangelands in Turkey are State owned and used as communal land for grazing and other purposes. Village communities have usufruct rights, which can be confirmed by the Government with an assessment certificate issued collectively to a village. Individual users are supposed to pay a fee that is to be used for maintenance, rehabilitation, and protection of the rangelands. In practice, however, rangelands tend to be overused without proper management.

(4) Soil erosion

Soil erosion is a common problem throughout the DOKAP region. It is caused generally by improper agricultural practices especially on slope land, deforestation, unstabilized rural roads and construction works for dams, roads and other infrastructure facilities. In the southern areas where the climate is semi-arid, heavy rain following an extended dry period tends to wash away shallow brown forest soil. Despite the permanent vegetation cover offered by the two dominant crops of tea and hazelnuts, the northern slopes of mountains are vulnerable to soil erosion with flash floods.

(5) Salinity in irrigated areas

Salinity is a serious problem in irrigated agricultural land in internal areas of the DOKAP region. High evaporation rate of internal land incurs high risk of salinity. Increased salinity creates great risk of unproductive agricultural land. Higher salinity levels further cause deterioration of water quality. Proper irrigation management and irrigation design is a key to preventing problems associated with salinity.

3.5.2 Development objectives

Objects of the DOKAP rural environmental development are established as follows:

(1) To preserve natural resources as a foundation of sustainable economic growth through community-led resources management;

(2) To support resource-based rural tourism as a tool for a vital economic activity; and

(3) To raise awareness among people to conserve rich tradition, culture and nature of the rural area of the DOKAP region.

3.5.3 Strategy

No single project or option can solve the region's rural environmental problems. Natural resources management in the rural area is so complex that it requires radical changes in land use policies. It also requires new arrangements in legislation and institution, and even radical change in traditions. Concerted efforts are needed to improve rural conditions and farming practices, to coordinate institutions and reforms, to mange watersheds, and to involve a wider range of stakeholders.

(1) Promotion of rural tourism

Rural tourism will provide a viable means to protect and enhance rural environment. It is a kind of low impact tourism utilizing local resources and revitalizing local cultures. Rural houses, that may be neglected otherwise, may be rehabilitated to provide low cost accommodation for tourists together with the provision of common facilities. Local festivals and food, and participation in socio-cultural or even economic activities are among the features as well as trekking and other common tourist activities.

Given the importance of ecosystem in the forest area in the DOKAP region, the program should be explicitly linked to the Protected Area Management System Improvement and Environmental Inventory. Initially, incentives for the rural tourism program should be given only to the selected village communities based on a set of criteria, as concentrated investment and promotion efforts are needed. Unlike in the past, declaration and designation of 'tourism priority areas' by Ministry of Tourism and municipalities should be carefully done. Such incentives and promotion should be given only to strategically selected areas using strict and rational criteria, not local politics.

The tourism promotion should be integrated into a part of sustainable forest management, as the rural tourism is a 'resource-based' tourism. Evidence in Ayder in Rize, for example, proves that such insensitive designation of 'tourism priority areas' only promotes mass tourism and kills tourism itself. Considering the over-development at Uzungöl, Trabzon and Ayder, Rize, where unmanaged growth and resource use have deteriorated the surrounding environment, strict control over promotion, coordinated guidance and law enforcement based on the master plan should be implemented in rural tourism development.

Initially, promotion of rural (or Yayla) tourism should be limited to specialized tour operators whose customer-base has a certain tolerance to insufficient physical tourism facilities. Infrastructure development, such as building access road for mass-tourism should be controlled and coordinated based on economic feasibility taking account of environmental impacts and other external costs.

(2) Land tenure improvement

Improvement of land tenure holds a key for managing living environment of villagers, avoiding indiscriminate use of forest areas and overuse of grazing lands. Land tenure for forest areas occupied by forest villages should be clarified, depending on land suitability, while forest protection areas re-delineated. Use rights for exploitation of non-wood forest products should be established to guarantee this livelihood option for villagers together with their management responsibilities. Communal ownership of grazing land may be established with proper management organization for more flexible yet sustainable uses of such lands.

(3) Land use rationalization

Sound agricultural practices are important to protect land from erosion, particularly on steep slope lands. Crop cycle management is also important as

irrigation development is expected to be accelerated in inland area under the DOKAP program. Proper crop cycle practice should be applied for protecting topsoil. Land selection to be covered by irrigation services should be rationalized using scientific data obtained from advanced technology such as a GIS.

(4) Irrigation management and soil conservation

Proper irrigation management should be applied as irrigation development is planned and proposed to accelerate in the DOKAP region. Further research on irrigation control and management should be implemented. Conventional irrigation control is typically based on calculation of average water usage. The calculation is based on a combination of measured transpiration rates obtained under research conditions and farmers experiences in the field, and a physical examination of the soil. Conventional irrigation control is by observing signs of stress or over-watering. This leads to irrigating on an average basis. That is, the amount of water applied tends to be fairly consistent over a period of time, so similar and quite large amounts of water are applied at regular but long intervals. Irrigation may, for instance, be applied for 10 hours every five days. At certain times conventional irrigation will apply too much water, with the excess being lost to soil sub-layers. In well drained soils not prone to waterlogging, this will do little harm to production, but will have cost and environmental implications. In poorly drained soils, this will cause salinity build-ups and lead to a loss of production. At other times, conventional irrigation will simply not be applying enough water. This will tend to occur during potential peak growth periods.

(5) Participatory watershed management

Participatory watershed rehabilitation should be implemented with a specific focus on reforestation, improved range management and environmentally sustainable farming. It should address rural poverty and natural resource degradation in the upper sheds of the Çoruh river, where erosion problems appear to be particularly severe. Increasing involvement of local communities in the planning and management of local resources would help achieve success. Legislative arrangement and legal framework to support such community involvement should be furnished.

Typical activities under the watershed management are listed below.

- Integrating agricultural support policies with efforts to preserve land resources (promoting sustainable agricultural practices, such as reducing the use of chemical fertilizer, selection of appropriate farming land, control of

banned pesticides, prevention of salination, selection of crops that do not consume heavy amount of fertilizer, proper irrigation practices and well-designed drainage, rational land conversion of fertile farmland to other purposes.);

- Developing on-the-job soil conservation-related training programs in relevant institutions and for farmers;
- Ensuring farmers' contribution to land improvement and conservation investments; and
- Opening channels for participation of farmers into the decision making process for integrated watershed management.

(6) Improved afforestation and reforestation program

The current reforestation and afforestation program is not necessarily successful in terms of the ratio of plants that survive. The success of the program should be evaluated based on measurable indicators showing the real accomplishments rather than how many hectare MOF planted per year. Observations in Bayburt and Gumushane indicate that significant percentages of seedings die every year because of applying homogeneous planting methodologies without carefully considering soil capability, ground cover species, terrain, and surface water flow, etc. Selection of plant species should be more carefully conducted with much closer collaboration with the Department of Forestry, KTU, and the Forest Research Institute of MOF (Trabzon). Planting methods should be carefully selected based on the results of extensive test planting. Non-tree species can be chosen in the area where the successful rate of planting trees is low.

In order to increase the survival rate significantly, decenterization of the state power is much needed. In addition to the collaboration with KTU, use of local knowledge and expertise should be much more emphasized. Indigenous knowledge should be systematically collected and reflected into the forest management. Locations of nurseries should be much closer to the ongoing reforestation areas in order to increase the survival rate. Management of watershed should be eventually transferred to local communities. In line with this goal, a specific action plan should be developed. The proposed monitoring system should include the reforestation programs with a feedback mechanism installed to reflect ongoing reforestation programs.

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Appendix 1

Examples of Endemic Species Found in the DOKAP Region

The following are a few examples of approximately 300 endemic plant species found in the DOKAP region. There are, at least, 2,460 species of vascular plants known to occur in the region. About 12% of plants species are endemic to Turkey. Of all these endemic species, 160 (6.5%) are known only from Northeast Anatolia. Majority of the endemics occur along the Euxine phytogeograhical province in Turkey, bordering the Black Sea. There is, however, sudden increase in their frequency east of the Melet River near the city of Ordu, where the Gruziya phytogreographical province shares the border. Center of endemism in Northeast Anatolia also include the Cimil region, Coruh Gorge and mountains above Artvin and outlying villages. The area in the vicinity of Bayburt marks the northern end of "Anatolian Diagonal", which forms an important floristic demarcation in Anatolia (Davis 1971; Ekim and Guner 1986).

(1) Endemic to the Northeastern Anatolia

Renunculus tempskyanus

Papaver latertium

Silene scythcina,

Doronicum tobeyi

Centaurea (7 species)

Hieracium (24 species)

Symphytum savvalense

Symphyandra lazica,

Cyclamen parviflorum,

Lamium sulfureum,

Lilium ciliatum

Crocus aerius

An entire section of *Campanula,*

(2) Endemic to the Northeast Anatlia and other phytogreographical provinces

Section of *Symphyandriformes Epigaea gaultherioides* (the Northeast Anatlia and Gruziya)

Tanacetum coccineum subsp. Chamaemelifolium (Endemic to the Northeast Anatolia and Gruziya)

(3) Of the 97 pteridophyte taxa occurring in Turkey, 64 occur in Northeast Anatolia and 28 of these are apparently found nowhere else in Turkey. Examples include following.

Rhodothamus sessilifolius (the only other species of the genus occurs in the eastern Alps)

Rhoamphicarpa medwedewii (the nearest relative of which occurs in tropical African: east Africa, and Australasian: western India)

Lilium ponticum group (4 species: whose nearest allies are in eastern Asia)

Hymenophyllum tunbrigense (Only found in the Northeast Anatolia and adjacent parts of Caucasia)

Dryopteris aemula (Only found in the Northeast Anatolia and adjacent parts of Caucasia)

Cynoglossum imererinum (nearest localities or nearest relatives occur only in Himalaya and Afganistan)

Duchesnea indica (nearest localities or nearest relatives occur only in Himalaya and Afganistan)

Source:

Davis, S.D., Heywood, V.H. and Hamilton, A.C. ed. (1994). Centers of Plant Diversity, A Guide and Strategy for Their Conservation. World Wide Fund for Nature and The World Conservation Union

Appendix 2

Important Forest Ecosystems in the DOKAP Region

1. Firtina Valley

1.1 Location

Camlihemsin, Rize (41° 06' N; 41° 00' E)

1.2 Habitat description:

Threatened by various human activities

Area: 15,000 ha

Firtina Valley is situated on the northern skirts of the huge Kaçkar Mountain range (which is already a National Park) and falls inside WWF Global Ecoregion No. 74: "Caucasus and NE Anatolia Temperate Forests". This is one of the steepest rises on earth, from the sea level to 3,992 m. Due to the steep slopes, soil erosion is a major problem. The average annual rainfall is fairly high (over 2,000 mm) and clouds cover the higher altitudes most of the time. The site includes all the principle habitats for which mountains of the Eastern Black Sea are famed: riverine forest of alder, temperate deciduous forests of oriental beech and others; coniferous oriental spruce forests, pastures and meadows, sub alpine scrub communities, and cliff habitats. The area exhibits exceptional botanical diversity and a remarkably high total of nationally local and rare species are recorded. Of all the larger river catchments draining the northern slopes of the Eastern Black sea mountains, this river system is perhaps the most intact and includes one of the few areas of riverine alder woodland and grassland still remaining in Turkey. The area hosts 537 vascular plant species, 109 birds, 23 mammals, 21 reptiles; including unique old-growth stands of common box and the endemic sea trout (Salmo trutta labrax "marina"). Tea cultivation predominates the agricultural landscape.

1.3 Ownership Structure:

All forest areas are state owned. However, there are patches of private areas around the villages converted from natural forests to cultivation (mainly tea).

1.4 Details of threatened or significant animal or plant species:

The "Marina' ecotype of Salmo trutta labrax (endemic sea trout), the alluvial riverine forests of Alder and the rare common box stands (B. sempervirens) are threatened by the construction of hydropower plants.

1.5 Threats:

Planned hydro-electrical power plants on the river system are the most serious threat. Construction of the first HEP project has started upon approval by the government, despite opposition by the environmentalists and the indigenous people. The other threats are: road construction, intensive tourism, urban development, and pollution at the pasturelands.

1.6 Current legal status:

Unprotected forest, managed by the state for timber production.

1.7 Required legal status:

The buffer zone of adjacent Kaçkar Mountains National Park should be extended to cover Firtina Valley.

1.8 Required management:

The construction of Dilek-Guroluk HEP has to be stopped urgently; and similar planned projects must be cancelled. The management plan should allow traditional use and soft tourism for the benefit of indigenous people, while natural resources are protected. Construction of roads, hydroelectrical power stations and urban development at the high pasturelands should be restricted.

1.9 Stakeholders involved in the required activities:

-Administration (MOF)

-Resource protection and management program (by MOF)

-Tourism and recreation program (by MOF, NGOs, private sector)

-Interpretation and education program (by NGOs)

-Research and monitoring program (by universities, MOF, NGOs)

-Buffer zone cooperation program (by MOF, other relevant ministries, private sector, NGOs, local residents)

-International cooperation program (MOF, NGOs)

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2. Karcal Mountains

2.1 Location:

Artvin (41o 22' N; 42o 01' E)

2.2 Habitat description:

Threats are still minimal but increasing

Size: 25 000 ha

Karcal Mountains are situated in the "Colchic Section" of the Euro-Siberian Floristic Region in NE Anatolia, near the Georgian border and is the one of the best representative of the "Temperate Mixed Deciduous Forest of Eastern Black Sea." Main features of the area appear as 1) its old-growth pristine forest, 2) sudden altitudinal changes possesing various ecosystems and community compositions, 3) high number of colchic endemics 4) traditional

lifestyle which goes harmoniously with nature, and 5) wildlife habitats. The most diverse forest lies between 400 and 900 m and the most prominent species are sweet chestnut (C.sativa), hornbeam (C.orientalis), alder (A.glutinosa), spruce (P.orientalis), oriental beech (F.orientalis), lime (T.rubra subsp. caucasica), oak (Q.petraea). At 1,000-1,800 m old-growth pristine forests which are mainly dominated by beech and spruce appear. Above this, sub-alpine shrubs i.e. Rhododendron spp., bear grape (V.arctostaphylos), dwarf junipers (J.communis subp.) and, Daphne glomerata etc. exist. 2000-2400 m is the zone of alpine meadows with many colchic endemics. Small stands of Betula pendula and Betula medvediewii also exist around here. The forests around the villages (500-900 m) and the pastures (1800-2200 m) are used to maintain wood for construction, heating and other needs.

Since the old-growth pristine forests maintain good habitat for the wildlife, with the advantage of the low human population, the area has very high potential to keep big mammals. Although there is not any research conducted about the fauna; brown bear (U.arctos), wild goat (C. aegagrus), chamois, wild boar (S.scrofa), jackal (C. aureus), fox (V.vulpes), gray wolf (C.lupus), otter (L. lutra) are the species which can be mentioned in the first turn. Although these species used to be widespread, they have been subject to intensive hunting, especially brown bear and wild goat. However, it can be easily said that the area is one of the best brown bear habitat, not only in Turkey but also in Europe too. The main reason behind this is the diverse vegetation structure that forms a mosaic of habitats. In addition, the basin is on the one of the most important migration routes of the birds of prey. Also, it is worth mentioning the two species of the snowcocks (Tetraogallus caspius and Tetraogallus caucasus) living in the alpine meadows which are indicator of healthy habitats.

2.3 Ownership structure:

All forest areas and alpine pastures are state owned. However, there are patches of private agricultural areas converted from natural forests around the villages.

2.4 Details of threatened or significant animal or plant species:

There is ongoing survey for the flora but it has not been completed yet. Some faunal surveys were carried out during GEF II project missions by the World Bank. However, it is obvious that wild goat (Capra aegagrus) and red deer

(Cervus elaphus) were widespread in the area. But they are rare now as they have been intensively hunted. Another threat is poaching of brown bear. Local people do not have sympathy for brown bear as it damages agricultural land and kills the livestock. But it still has very good population and the area is one of the best habitat throughout the whole Europe.

2.5 Threats:

Logging still appears to be the most important threat due to the lack of official conservation status. Other threats are: Uncontrolled logging of beeches for heating, use of lime tree (Tilia rubra subsp. caucasica) for traditional bee-hives, avalanches which can cause great damages especially in the sensitive areas where grazing pressure is so high, forest pests such as; Dutch elm disease and Dendroctanus micans. Also, conversion of forest to hazelnut plantations need to be controlled to prevent future destruction.

2.6 Current legal status:

There are two small Nature Reserves (Camili-Efeler: 1453 ha; Camili-Gorgit: 390.5 ha). However, this is not enough to protect the natural values of the whole area and it still needs a more complete protection. The rest of the site is unprotected and timber exploitation is going on. Previously, there were some attempts to declare the area as a national park; but it could not be achieved, as the area is located at a 1st degree military zone.

2.7 Required legal status:

Biosphere Reserve is one of the most proper protection status for the area; as it allows both conservation and sustainable use of natural resources (which is vital for the local people) through zoning system.

2.8 Required management:

The old-growth pristine forest that extends in the mid-altitudes has to be considered in the strict protection zone. The "lowland" and the "upland" forests could be considered in the buffer zone, which require intensive management to meet the needs of local people (wood for heating, construction, bee hives, etc). An education program for local people and the forest staff is required.

Conducting research studies would be necessary to decide for the future management opportunities.

2.9 Stakeholders involved in the required activities:

-Administration (by MOF)

-Resource protection and management program (by MOF)

-Interpretation and education program (by NGOs)

-Research and monitoring program (by universities, MOF, NGOs)

-Buffer zone cooperation program (by MOF, other relevant ministries, private sector, NGOs, local residents)

-International cooperation program (MOF, NGOs)

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Appendix 3

Examples of Migrating Raptor Counts in the DOKAP Region

Eastern Black Sea Region is known for the concentrated passage of migrating raptors probably originating from Russia, west of Urals, north up to Fenno-Scandia. Approximately 90% of the total passages are *Pernis apivorus* (Honey Buzzards) and *Buteo buteo vulpinus* (Steppe Buzzards). According to an observation conducted by British observers (Andrews et al 1977, Beaman 1977), total number recoded is shown in the table on the next page.

The count only reflects the actual numbers migrating through the area. The migration patterns of individual species can be ascertained. Raptors spend summer in Europe, then they pass the western end of the Cucasus. They follow the Black Sea coast further southward. As the coast bends westwards, the birds are forced to cross the mountain range, after which they traverse the higher parts of Anatolia (the Armenian Highland) and the far eastern spur of the Taurus mountain range. Large number of the birds enter the mountain range via the Coruh River valley, beginning just south of Batumi, Georgia, where the Coruh River flows into the Black Sea, and follow it upstream. They enter Turkey at Muratli, and via Borcha they get to Artvin. Large number of birds were observed at Goktas, Artvin on September 8, 1987 (Magnin 1987) and followed a more straight south-southwest direction toward Erzurum. These observations support the assumption that birds follow the same course after they have left the Coruh. After this, the birds face another stretch of thousands of kilometers of semi-desert and mountainous areas before they finally reach their wintering quarters in Africa. It seems, however, plausible to assume that the main passage of Honey Buzzards took place during August and the first two weeks of September (Sutherland and Brooks 1981). Given migrating patterns observed in various studies (ie. Andrews et al. 1977, and Beaman 1977), significant numbers of raptors migrate through the area.

Table 1 Autumn migration in northeastern Turkey during 1976 and 1977

	1976 August 17-October 10	1977 October 11-25
Ciconia nigra	79	2
Pernis apivorus	138,000	26
Milvus migrans	5,775	10
Haliaeetus albicilla	1	-
Neophron percnopterus	5	-
Gyps fulvus	2	30
Circaetus gallicus	243	21
Circus aeruginosus	385	7
C. cyaneus	8	41
C. macrourus	133	22
C. pygargus	124	-
Circus sp.	716	-
Accipiter gentilis	15	53
A. nisus	688	1,057
A. brevipes	290	-
Accipiter sp.	159	-
Bueteo buteo (mainly B.b.vulpinus)	205,000	5,182
B. rufinus	5	9
Buteo/Pernis	26,000	-
Aquila pomerina	736	16
A. clanga	21	11
A. nipalensis	271	434
A. helicaca	3	17
A. chrysaetos	3	4
Aquila sp.	505	-
Hieraaetus pennatus	473	-
Pandion haliaetus	24	-
Falco naumanni	47	-
F. tinnunculus	30	450
F. vespertinus	23	-
F. calumbarius	-	21
F. subbuteo	189	-
Falco sp. (small)	433	-
F. cherrug	12	-
F. peregrinus	8	-

Constraints

Significant numbers of migrating birds are killed by illegal hunting methods, such as falconry, traps, and nets.

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Appendix 4

Sedentary and Migratory Birds Found in the DOKAP Region

The following is a provisional list of all regularly breeding or migrating bird species found in the DOKAP region. The list also indicates each species' SPEC category and European Threat Status. The indication key of "m" or " b" for migrant or breeder is only for provisional purpose. A number of heron species are seen only along the coastline for migration and they are included in the list. Other coastal/marine species, such as cormorants and gulls are also included.

Species	Migrant/ breeder	SPEC category	European Threat Status
black stork	m	3	r
honey bizzard	m	4	r
black kite	m	3	v
black vulture	b	3	v
lammergeier	b	3	e
egyptian vulture	b	3	e
griffon vulture	b	3	r
short-toed eagle	mb	3	r
marsh harrier	m		s
hen harrier	m	3	v
pallid harrier	m	3	e
montagu's harrier	m	4	s
goshawk	b		s
sparrowhawk	b		s
levant sparrowhawk	m	2	r
bizzard	mb		s
long-legged buzzard	mb	3	(e)
lesser-spotted eagle	m	3	r
greater-spotted eagle	m	1	e
steppe eagle	m	3	v
imperial eagle	mb	1	e
Species	Migrant/ breeder	SPEC categoty	European Threat Status
golden eagle	b	3	r
booted eagle	mb	3	r
osprey	m	3	r
lesser kestrel	b	1	(v)
kestrel	b	3	d
red-footed falcon	m	3	v

merlin	m		s
hobby	mb		s
saker	mb	3	e
peregrine	mb	3	r
Caucasian black grouse	b	2	ins
Caspian snowcook	b	3	ins
quail	mb	3	v
crane	mb	3	v
green sandpiper	m		(s)
common sandpiper	b		s
rock dove	b		s
stock dove	b	4	s
woodpigeon	mb	4	s
collared dove	b		(s)
turtle dove	mb	3	d
cuckoo	mb		s
tawny owl	b	4	s
alpine swift	b		(s)
swift	b		(s)
kingfisher	b	3	d
bee-eater	mb	3	d
roller	mb	2	(d)
hoopoe	mb		s
wryneck	b	3	d
grey-headed woodpecker	b	3	d

Species	Migrant/ breeder	SPEC categoty	European Threat Status
green woodpecker	b	2	d
black woodpecker	b		s
great spotted woodpecker	b		s
syrian woodpecker	b	4	(s)
lesser spotted woodpecker	b		s
white-backed woodpecker	b		s
shore lark	b		(s)
crag martin	b		s
Swallow	mb	3	d
red-rumped swallow	mb		s
house martin	mb		s
tree pipit	mb		s
water pipit	b		s
yellow wagtail	m		s
grey wagtail	b		(s)
white wagtail	mb		s
Dipper	b		(s)
Wren	b		s

Dunnock	b	4	s
alpine accentor	b		s
Robin	mb	4	s
Nightingale	mb	4	(s)
black redstart	b		s
Redstart	b	2	v
Whinchat	b	4	s
Stonechat	b	3	(d)
Wheatear	b		s
black-eared wheatear	b	2	v
rock thrush	b	3	(d)
blue rock thrush	b	3	(v)

Species	Migrant/ breeder	SPEC categoty	European Threat Status
ring ouzel	b	4	s
Blackbird	mb	4	s
song thrush	mb	4	s
mistle thrush	b	4	s
cetti's warbler	b		s
marsh warbler	b	4	s
olvaceous warbler	b	3	(v)
lesser whitethroat	b		s
Whitethroat	b	4	s
garden warbler	b	4	s
Blackcap	b	4	s
green warbler	b		(s)
mountain chiffchaff	b		(s)
Goldcrest	b	4	(s)
spotted flycatcher	b	3	d
semi-collared flycatcher	b	2	(e)
red-breasted flycatcher	b		(s)
sombre tit	b	4	(s)
long-tailed tit	b		s
coal tit	b		s
blue tit	b	4	s
great tit	b		s
kruper's nuthatch	b	4	(s)
Nuthatch	b		s
rock nuthatch	b	4	(s)
Wallcreeper	b		(s)
Treecreeper	b		s
short-toed treecreeper	b	4	s
penduline tit	b		(s)
golden oriole	b		s

Species	Migrant/ breeder	SPEC categoty	European Threat Status
red-backed shrike	b	3	(d)
Jay	b		(s)
Magpie	b		s
alpine chough	b		(s)
Chough	b	3	v
jackdaw	b	4	(s)
rook	b		s
carrion crow	b		s
raven	b		(s)
starling	b		s
rose-coloured starling	m		(s)
house sparrow	b		s
rock sparrow	b		s
snow finch	b		(s)
chaffinch	b	4	s
red-fronted serin	b		(s)
serin	b	4	s
greenfinch	b	4	s
goldfinch	b		(s)
siskin	b	4	s
linnet	b	4	s
twite	b		s
crossbill	b		s
crimson-winged finch	b		(s)
scarlet rosefinch	b		(s)
bullfinch	b		s
cirl bunting	b	4	(s)
rock bunting	b	3	v
ortolan bunting	b	2	(v)
black-headed bunting	b	2	(v)
corn bunting	b	4	(s)

Total of 143 species are recorded

Table Keys

Migrant/breeder

m migrant bird

b breeder bird

mb both of above

SPEC category

1	Species of global conservation concern, i.e. classified as Globally Threatened, Conservation Dependent or Data Deficient.
2	Concentrated in Europe with an Unfavorable Conservation Status
3	Not concentrated in Europe with an Unfavorable Conservation Status
4	Concentrated in Europe with Favorable Conservation Status

European Threat Status

e	Endangered	l	localised
v	Vulnerable	ins	Insufficiently known
r	Rare	s	Secure
d	Declining	( )	Status provisional

Summery of European Threat Status criteria and categories

European pop. trend	<250 pairs	<2,500 pairs	<10,000 pairs	>10,000 pairs
large decline	**endangered**	**endangered**	**endangered**	vulnerable
moderate decline	**endangered**	**endangered**	vulnerable	declining
no decline	**endangered**	vulnerable	rare	secure

Source: Magnin, G. (1995), unpublished document dated on May 16, 1995. Dogal Hayati Koruma Dernegi: Istanbul, Turkey

Appendix 5

Fauna Observed in the DOKAP Region

Large Mammals

Latin Name	Common Name	Turkish Name	Description
Cevus elephus	Red Deer	Geyik	Prefers deciduous and mix forests (but also occurs in conif. Strong decline across Turkey. Turan's reports suggest the specie no longer occur in the DOKAP region as the last record was from 40 years ago.
Capreolus capreous	Roe Deer	Karaca	Occurs on north facing slopes in dense, young, lush forests mainly decid and mixed forests above 600m. Prefers forests interspersed with open areas, meadows and fields. Reported from Uzungöl, Sumela, Arhavi, Artvin, Giresun and Ordu. This indicates that the specie is distributed thinly throughout the DOKAP region
Capra aegagrus (=hircus)	Ibex. Wild Goat	Yabankecisi	Occurs in open areas between 2,000 and 4,000m but lower in winter. Reported from Yusufeli, Artvin, Bavur Dagi and Kaçkar. In Turkey only occurs in Taurus mountains and eastern Turkey.
Rupicapra rupicapra	Chamois	Cengelbuynuzlu Dagkecisi	During summer above tree line on yaylas and rocky areas; during winter descends to forests. Rarely bellow 1,500 m. Occurs throughout project area, but nowhere very abundant: best places appear to be Ovit yaylasi and south of Arhavi. In Turkey only occurs in eastern Turkey: main distrubution is NE-Turkey.
Sus scrofa	Wild Boar	Yabandomuzu	Prefers lush, dense deciduous, and mixed forest areas with marshes, streams etc. Occurs commonly throughout the area at lower altitudes, but not in open areas. Common in whole Turkey.
Ursus arctos	Brown Bear	Bozayi	Found in mixed and deciduous forests from 300m and above treeline upto 2,800 meters. Semi-hibernates in places where winter is severe. Reported to cause damage to crops; this led to granting of shooting licenses over the last decade. The total number killed per year is unknown.

Latin Name	Common Name	Turkish Name	Description
Canis aureus	Jackal	Cakal	Local and probably rare, reported from one locally in Kaçkar complex. Turan reports it occurs in the lower foothills all along the Black Sea. Common and very common in many other parts of Turkey.
Canis lupus	Wolf	Kurt	Occurs in wide range of habitats including forests. Typical forests in project area may be too dense from wolves as only reported from south slopes of Kackar range and presumably distribution is from there southward since reportedly "common" in Erzurum area and further east. May come down to lower areas in north during winter. Otherwise widely distributed in Turkey.
Vulpes vulpes	Fox	Tilki	Reported only from Canik Dagi, one of peaks in Kackar Mountain area. In the rest of Turkey, very common and wide spread.
Felix sylvestris	Wild Cat	Yaban Kedisi	Occurs throughout area mainly in dense mixed and decidous forests. Occurrence in Turkey as Lynx (below).
Lynx lynx	Lynx	Vasak	Occurs in small numbers throughout project area in all types of forests but prefers forests with stony areas and cliffs etc. up to 2,500 meters. In Turkey, occurs mainly in northern Turkey, Aegean and some areas in Taurus mountains.

Medium sized and small mammals

Substantial numbers of small mammals have been observed in the DOKAP region. There have been no comprehensive research on mammals in the region, and therefore there is not enough information to draw definite distribution maps of any mammal species. The following are some examples of mammals commonly observed in the area.

Latin Name	Common Name	Note
Martes Martes	Pine Mrten	
Mustela erminea	Stoat	
Mustela nivalis	Weasel	
Lurta lutra	Otter	Probably local at stream, but no information available
Vormela peregusna	Marbled Polecat	
Putrius putrius	Polecat	
Scirius vulgaris	Red Squirrel	
Lepus europeus	Hare	Rare in southern part of area
Meles meles	Badger	Reported throughout area

Source: Magnin, G (1995). Unpublished paper dated on May 16, 1995. DHKD, Istanbul, Turkey

Appendix 6

Table 1 Applying Collaborative Approach to Forest Management in the DOKAP Region (1/3)

Level of Participation	Benefit to Agencies	Benefit to Local People	Benefit to Society	Input Required from Agencies	How to obtain Input	Time Requirement
Community Control – Active Participation To allow (and when necessary give power to communities to take control of forest planning and management)	- Mature, non-paternalistic approach of working - Fulfill UNCED commitment to increase development opportunities; democracy and equity. - Increased awareness of problems, resources and opportunities. - Less administration and bureaucracy. - Minimize management inputs.	- Employment of local knowledge, skills and resources. - People's skills improved and diversified. - Stronger local initiative, more self-reliance. - Gives full scope to local entrepreneurial spirit and ingenuity.	- Increased political support to the government. Initiatives are more efficient and more durable. - Public funds and resources used to do what they were raised for. - Because local communities possess greater stability and continuity than national governments their investments are made for the next generation rather than for the next election. - Local people contribute to planning and decision-making at the national, regional and district level.	- Implementing joint forest management agreement - Monitoring joint forest management - Supporting the creation of local forestry companies. - Negotiating innovative land leasing or purchase agreements.	- Training, machinery, technical expertise, financial resources. - Participatory Forest Appraisal and Planning Process - Training, technical expertise, financial resources. - Through a fundamental rethink of the evaluation of state forest.	- According to details of agreement - Small amount of time over a period of year. - Depends on local situation. - Depends on the political will of all involved.

Appendix 6 Table 2 Applying Collaborative Approach to Forest Management in the DOKAP Region (2/3)

Level of Participation	Benefit to Agencies	Benefit to Local People	Benefit to Society	Input Required from Agencies	How to obtain Input	Time Requirement
Full Community Involvement – Interactive Participation To involve people meaningfully and effectively in joint analysis leading to action plans and to enable the formation of a local independent decision-making	- Cheaper in the long term - Less conflict with local people. - Uses focused technical expertise to fulfill local aspiration. - Reduced amount of time required for management, especially protection for site. - Improved relation.	- Devolves power. - Assists local people to get to a point where they can take full control if they want. - Matches local skills and knowledge with that of the agency - No big capital outlays. - Strengthens local institutions and local skills base. - Local people acquire benefits from forestry resources and related initiatives.	- Begins the process of diversifying and strengthening the local economic base. - Involves new actors in the development process. - Initiatives become more effective, more efficient and more durable. - Public funds spent to do what they were raised for. - Public employees working to assist people.	- Employing people to work in, for example, commercial nurseries, plantation maintenance and harvesting operations, in forests near where they live.	- Local skills audit and encouragement of local tendering.	- Skills audits take days (rather than weeks.)
Partial Community Involvement = Functional Participation To invite interested members of a community to become involved with "appropriate" aspects of the planning, implementation and management	- Major decisions made by agencies - Participation of local people is defined by agencies. - Increased awareness of problems, resources and opportunities. - Access to volunteer labor - Starts to reduce conflict and costs.	- Use of some of the local knowledge, skills and resources. - Local people have some input into aspects of planning and management. - People may have input into plans but may not be involved in implementing them.	- Less paternalistic than the Level 4 (consultation).	- Enabling local input into forest design. - Forest product licenses	- Participatory Forest Appraisal and Planning Process. - Access agreements	- A few days - Depends on situation

Appendix 6 Table 3 Applying Collaborative Approach to Forest Management in the DOKAP Region (3/3)

Level of Participation	Benefit to Agencies	Benefit to Local People	Benefit to Society	Input Required from Agencies	How to obtain Input	Time Requirement
4. Consultation – Participation by Consultation	- Agencies do the analysis and develop plans. - Information being delivered belongs to the professionals. - May fulfill the minimum requirement for public participation. - External agents make decisions and are not under obligations to take on broad local views.	- Local people are given a restricted choice and role in solutions and plans	- Less paternalistic than the Level 5 (Information Giving). - Any ideas that do come up from local level have a chance.	- Training facilitators and procedures for development of projects, plans or policy.	- Participatory Forest Appraisal and Planning Process.	- Depends on whether agency staff will be doing the facilitation.
5. Information Giving = Participation in Information Giving	- Fulfillment of traditional education objectives	- Local people are informed of development and plans.	- Access to information.	- Enabling local people to identify what type of information may require.	- Participatory Forest Appraisal should be used. Follow indications as to what people want in a locality.	- A few days
6. Agency Control = Passive Participation	- Agency only needs to inform local people. - Cheap in the short term		- Better than outright persuasion.	- Maintain conventional forestry technical support services and extension.	- Send copies of project, planning or policy documents to individuals and organizations on a mailing list compiled by officials solely for the information of the citizens and groups. - Hold formal public meetings when invited which are not publicly advertised to present and defend documents.	

Appendix 7

List of Environmental Laws and Regulations

- Turkish Environmental Law
- Law of Conservation of the Culture and Natural Object
- Law of National Mobilization for Afforestation
- National Park Law
- Forest Law
- Land Hunting Law (Number 3167)
- Law of Industrial Estates
- Water Pollution Control Regulation