

FOREWORD

Towards the attainment of sustainable development, besides appropriate economic and social policies, a set of essential steps including the development of an environment strategy; for identification of priorities in relation to the environmental investments, creation of the basis of collaboration between relevant organizations; and collection of information on environmental investment programs to mobilize the support of the international organizations are required. Preparation of “the National Environmental Action Plan” emanated from the need to respond to these requirements.

The process of preparing the National Environmental Action Plan (NEAP) for the country started in the first months of 1995, under the coordination of the State Planning Organization and with the technical assistance of the Ministry of Environment and the financial support of the World Bank. Efforts were made to ensure a wide participation to the process of preparation. For this purpose, in addition to relevant public and private sector organizations, representatives from universities, non-governmental organizations, municipalities and professional organizations were invited firstly to take part in working groups and then in a series of search and decision conferences. Such a wide participation was deemed necessary to ensure the commitment and adoption of the final action plan by all parties and stakeholders.

Within the scope of the project, nineteen thematic “working groups” were formed. The National Environmental Action Plan was assembled within this framework, basing on the reports prepared by the working groups. The reports printed by our Organization, are available for readers and they should be considered jointly with the NEAP.

The Ministry of Environment will undertake the most critical role in the implementation of the Action Plan. At the present stage, the crucial point is to ensure the coordination of development and implementation of joint projects between relevant organizations, and to monitor the follow-up of the National Environmental Action Plan.

Meanwhile, the contributions of ministries and other organizations whose duties and responsibilities specified in the NEAP are equally important for the ultimate success of it.

I would like to thank all the members of the working groups; representatives of the Ministry of Environment, the World Bank and the State Planning Organization who worked as the members of the Executive Committee; the members of the Steering Committee for providing critical information and analysis for assembling the synthesis report and for their logistic support. I also acknowledge the labor of Dr. Yücel Çađlar from National Productivity Center and Dr. Josef Leitmann for drafting the NEAP.

I would like to remember Prof. Dr. Kriton Curi and Prof. Dr. Ferhan Hatipođlu, who passed away during the preparation process of the NEAP, with great respect and acknowledgment.

I would like to thank the World Bank for providing resources from the Institutional Development Fund for the preparation of the National Environmental Action Plan. I would also like to thank United Nations Development Program for their financial support for a series of stakeholder participation conferences.

I believe that the National Environmental Action Plan will be an important tool for the effectiveness of our country in the next century. My last thanks go to all the staff of the State Planning Organization who contributed into this work, specifically Project Coordinator Ms. Ýstiklal Alpar, Project Manager Ms. Sema Alpan and Project Assistant Ms. Ülya Çamur.

Prof Dr. Orhan GÜVENEN

Undersecretary for
The State Planning Organization

PREFACE

The attached National Environmental Action Plan (NEAP) attests to the recognition being given to the need to address the issues of environmental pollution and degradation. This NEAP defines environmental priority actions and identifies sources of pollution that are a threat to human health and the environment. While the NEAP is a remarkable effort in identifying the environmental needs of the country, the challenge remains in its implementation, given the wide range of priorities that need to be addressed.

Over the past three years, the Bank was privileged to observe the NEAP's development, which was a genuine participatory process. Important contributions from government agencies, industries, the private sector, academic institutions, non-governmental organizations (NGOs), and citizens have been incorporated in the document. The consultative process used in the preparation of this document has brought about public ownership of the NEAP which will facilitate its implementation. The credit for this goes to the State Planning Organization (SPO). The Ministry of Environment (ME) was the key partner of SPO during the process by providing technical assistance.

In order to achieve country's environmental objectives, the NEAP (i) proposes a number of actions for developing an effective environmental management system; (ii) emphasizes the need for enhancing environmental information and awareness; (iii) includes a set of new investment proposals on different thematic areas; (iv) builds the first steps to adopt EU environmental standards and regulations at a feasible pace for integration with the EU in the long term.

We endorse the need to improve environmental management, particularly building the institutional and regulatory capacity of ME and its local boards, including enhanced monitoring and evaluation; sustainable urban pollution abatement strategies, in collaboration with local governments; effective permitting and enforcement activities; and viable financing mechanisms to strengthen provincial environmental directorates. We further endorse the emphasis on phasing-out leaded gasoline, including the use of differential taxation to encourage the respective consumer behavior. We recognize the importance of increasing the use of natural gas for residential use and, where gas is unavailable, high quality coal along with an air pollution strategy for medium-sized cities. We support the call for corporatization of water and sanitation utilities and the need for cost recovery in setting respective user fees. Improved infrastructure services and efficient use of municipal resources, including the participation of the private sector is key to municipal reforms. We underline the serious soil erosion problems and hope that a concerted program can be developed to address this, drawing from the experience and practices of the Eastern Anatolia Watershed Management Project.

The Bank commends the significant work and participatory process in developing this important document and intends to draw from it in developing our Country Assistance Strategy. Support from the international bilateral and multi-lateral agencies is also critical to implement the environmental concerns raised in the NEAP. In this context, it is important to estimate the costs of some key action items that need to be addressed in the short term. We look forward to our collaborative work with the country in assisting to implement the NEAP.

Ajay Chhibber
Director
Country Department VI

ABBREVIATIONS

APSA	Agency for the Protection of Special Areas
BOD	Biochemical Oxygen Demand
COD	Chemical Oxygen Demand
DSI	State Hydraulic Works General Directorate
EFT	Environmental Foundation of Turkey
EIA	Environmental Impact Assessment
ENC	Environment Council/Ministry of Environment
EU	European Union
GAP	Southeast Anatolia Project
GDAR	General Directorate of Agricultural Reform
GDF	General Directorate of Forestry
GDRS	General Directorate of Rural Services/Prime Ministry
GDP	Gross Domestic Product
GNP	Gross National Product
HCE	Higher Council for Environment/Ministry of Environment
HCP	Higher Council for Planning
LEC	Local Environmental Council/Ministry of Environment
MARA	Ministry of Agriculture and Rural Affairs
ME	Ministry of Environment
METAP	Mediterranean Environmental Training & Action Program
MoF	Ministry of Forestry
MPWS	Ministry of Public Works and Settlement
MW	Megawatt
NEAP	National Environmental Action Plan
NGO	Non-governmental Organization
OECD	Organization for Economic Cooperation and Development
R & D	Research and Development
SIS	State Institute of Statistics
SFYDP	Seventh Five Year Development Plan
SPO	State Planning Organization
STRIT	Scientific & Technical Research Institute of Turkey
TIS	Turkish Institute of Standards
TL	Turkish Lira
UNDP	United Nations Development Programme
WG	Working Group
WHO	World Health Organization

EXECUTIVE SUMMARY

Introduction

1. Turkey has made great progress over the last fifteen years in creating mechanisms to address its environmental problems: the 1982 Constitution recognizes the right of citizens to live in a healthy and balanced environment; an Environment Act was passed in 1983; the Ministry of Environment was created in 1991; public awareness and demand for a clean environment are growing; and active non-governmental environmental organizations are emerging. Despite these positive developments, environmental issues have not been adequately incorporated into economic and social decisions.

2. Turkey's Seventh Five Year Development Plan (1996 - 2000) recognizes this inadequacy and calls for development of a national environmental strategy. The Development Plan is the main instrument for coordinating government policies, including those for environmental management. The National Environmental Action Plan (NEAP) responds to the need for a strategy and can supplement the existing Development Plan with concrete actions for integrating environment and development. The NEAP can make four additional contributions to national policy by: (a) serving as an input to the Eighth Development Plan; (b) being used as a building block for Turkey's National Agenda 21; (c) acting as the basis for discussion at the next biannual meeting of the High Council for the Environment of the Ministry of Environment; and (d) helping to represent Turkey's environmental outlook at upcoming regional and international arena.

3. The NEAP has been prepared by two separate but linked processes: (i) thematic groupings of experts; and (ii) participatory conferences of stakeholders. The first process culminated in the generation, by 19 working groups with over 800 experts, of reports and recommendations about a range of sectoral and cross-cutting environmental problem areas. Outputs of the working groups are being published by the Government. The second process was a series of meetings that involved more than 100 stakeholders to set broad goals, develop criteria for prioritization and rank recommendations found in the reports of the thematic working groups. This process and its outputs are summarized in Annex 1. The processes were guided by an Executive Committee consisting of representatives from the State Planning Organization, the Ministry of Environment and the World Bank which financially contributed to the preparation of the NEAP. The goals of the NEAP identified by the preparation process are:

- better quality of life;
- increased environmental awareness;
- improved environmental management; and
- sustainable economic, social and cultural development.

These goals guided the working groups, stakeholder workshops and formulation of the action plan.

4. Turkey has a number of unique physical, human and economic characteristics that influence environmental conditions and which are described in Chapter 1. **Physically**, it is at the crossroads linking Asia, Europe and Africa; this implies rich biodiversity, sensitive ecological habitats and a wealth of cultural and historical resources. It is surrounded by four seas with a total coastline of over 8300 km., presenting a range of issues for managing coastal zones and marine resources. Turkey's rugged topography experiences high seismic activity where earthquakes and erosion can pose hazards. Topography and soil conditions allow only a third of Turkey's total land area to be suitable for various types of agriculture, implying pressure on available fertile land. The country encompasses both the temperate climate that receives precipitation in all seasons and the subtropical climate where summers are dry; the heavy rainfall can increase the risk of landslides and floods. Turkey is generally blessed with an abundance of water resources, though it requires proper management to utilize the water in the most efficient way. Other natural resources whose management should receive attention include certain minerals, forests, fertile soils, and fisheries.

5. In **human** terms, Turkey is one of the 20 most populous countries in the world with an estimated 63.7 million people in mid-1997 and has the fastest population growth rate of all OECD countries (1.6% in 1997). A relatively high growth rate normally puts additional pressure on natural resources and results in greater production of wastes. The population is also rapidly urbanizing at 4.4% or nearly triple the national rate; by 2000, 70% of the population will be living in urban areas. Rapid urbanization usually exposes a growing population to a range of concentrated environmental problems and puts pressure on resources (e.g. marine and coastal resources). Rural migration to the urban centers usually originates in areas with low agricultural production where the use of land often exceeds its carrying capacity. Excessive migration combined with inadequate infrastructure facilities in the urban centers causes environmental concerns. In education, 80% of the population is literate and a quarter of the country is involved in some process of education and training each year; this situation can facilitate the spread of environmental awareness. In health, life expectancy is slightly better than the average for lower middle-income countries but under-five mortality is similar, raising questions about whether children suffer from unhealthy environmental conditions.

6. **Economically**, Turkey has been growing at double the average for OECD countries with a GNP per capita of US\$2999 (estimated for 1997) and a purchasing power parity was estimated at \$5580 for 1995. Rapid economic growth can lead to accelerated consumption of natural resources as well as pressure from increased waste generation. Industry and tourism are the fastest growing sectors of the economy, implying environmental problems with industrial waste and coastal degradation (where the majority of tourist facilities are located). Some 42% of the economically active population is concentrated in the agriculture sector which accounted for only 16% of GNP, suggesting heightened human pressure on soil, water, wildlife, and fisheries. Wealth is highly

unevenly distributed, both across socio-economic groups and regionally. Poverty has been linked to accelerated environmental degradation and increased vulnerability to environmental risks. Finally, past and current economic policies imply mixed environmental consequences: (a) full implementation of the Customs Union with Europe can increase pressure for higher standards of environmental quality; (b) accelerated privatization offers the potential of reducing pollution; and (c) sustained high growth, combined with a reduced public sector, may make it difficult to manage higher levels of pollution.

The State of Environmental Management in Turkey

7. The foundations of the Turkish system for environmental management were laid with the Third Five Year Development Plan (1973-1977), and the main features of this system were cast in the 1982 Constitution, the 1983 Environment Act, and establishment of the Ministry of Environment in 1991. Thus, Turkey's environmental management system and institutional base were both in place before the 1992 **Rio Declaration** and **Agenda 21** which set forth important changes in environmental protection policies, and management systems. Turkey recognizes the necessity to harmonize national environmental policies with approaches adopted by such international documents. Chapter 2 examines the status of this process by reviewing: (i) national environmental policy and international commitments; (ii) the legal framework for environmental management; (iii) the institutional setting; (iv) principal managerial instruments; and (v) the constraints on effective management, including the consequences of these constraints.

8. The current system for protecting and managing Turkey's environment is challenged by: (a) over-reliance on regulatory mechanisms; (b) little integration of environmental factors in planning; (c) limited public participation; (d) inadequate enforcement capability to implement environmental laws; (e) little use of environmental information; (f) over-centralization of budgets, authority and information; (g) low levels of awareness about environmental rules; and (h) inadequate environmental content in the educational system.

Profile of Environmental Problem Areas

9. Turkey's major environmental problems concern **the urban environment** (air quality, water supply and wastewater, and solid waste management), **natural resource management** (water resources, soils and land, forests, biodiversity), **marine and coastal resources**, **cultural and natural heritage**, and **natural as well as man-made environmental hazards**. Information is presented in Chapter 3 on status and trends, issues and causes, and options for each problem area. Finally, a preliminary number of **priority geographical areas** are identified where critical environmental problems converge.

Towards a NEAP

10. Over a thousand options were identified by the NEAP working groups (summarized in Annex 6), then grouped and ranked by the stakeholder workshops. The following criteria were used to rank these options: human health; ecological balance; amenity (cultural, historical and aesthetic) values; and economic productivity. Formulation of the NEAP was then guided by a set of (I) strategic objectives (reduce or prevent pollution, improve access to basic environmental infrastructure and services, encourage sustainable resource use, support sustainable environmental

practices, and minimize vulnerability to environmental hazards); and (ii) guiding principles (democracy and participation, consensus and commitment, efficiency and economic rationality, coordination and internalization of priorities, and decentralization of solutions to appropriate levels). The key findings of the NEAP preparation process can be summarized as:

- the existing system of environmental management, assessed in Chapter 2, is not up to the task of addressing many of Turkey's key environmental issues;
- enhancing information and awareness are the highest priorities identified by the participatory process for the NEAP; and
- the problem areas, reviewed in Chapter 3, will require specific new investments in order to protect, manage and rehabilitate Turkey's environment.

11. Thus, the NEAP is organized in three components that parallel these findings: (a) a program and supporting actions to develop a more effective system of environmental management; (b) actions for enhancing information and public awareness; and (c) investments for critical problem areas.

12. *Actions for Development of an Effective Environmental Management System.* The highest priority set of actions is to make the existing system for environmental management more effective. Significant resources are being used by the existing system. However, the current system is often ineffective so Turkey lacks the power to manage problem areas, issues are addressed in an *ad hoc* manner and long-term solutions cannot be sustained. Reform begins with a proposed program of urgent low and no-cost actions that should be taken to enhance the existing system. This is to be supported by short and medium-term studies and projects to (a) improve the institutional and legal framework and (b) integrate the environment into development planning.

13. *Enhancing Information and Awareness.* The NEAP participatory process concluded that the two highest-priority action groups should be: 1) development and efficient operation of reliable, updatable environmental information production systems; and 2) implementation of training programs for building awareness among stakeholder groups. Two projects as part of the action items in the NEAP are intended to enhance environmental information and awareness: (i) management of environmental data for improving analysis, decision-making and public awareness; and (ii) environmental education and training that would be conducted through both formal and non-formal channels. Better environmental information and a better-educated public could help address the problem areas identified in Chapter 3 by broadening government and public perception about the risks and costs of a degraded environment, helping government to more efficiently focus resources on priority problems, and increasing public pressure on the political system to tackle environmental issues.

14. *Investing in Improved Environmental Management.* New investments are needed in each of the problem areas that have been covered in Chapter 3. To tackle Turkey's key problems of the **urban environment**, projects are proposed to: improve waste management; encourage clean technologies and energy sources; and upgrade urban slums. To improve **natural resource management**, a large investment is proposed to upgrade rural environmental infrastructure. Investments for protecting and managing Turkey's biological diversity are already included in the national biodiversity strategy and therefore are not part of the NEAP. In addition, all of the

actions for integrating the environment into development planning should contribute to improved natural resource management. To protect and manage **marine and coastal resources**, a project has been formulated to improve management of the coastal zone. To protect **cultural and natural heritage**, an investment for environmental management in the GAP region is included as a priority. For **environmental hazards**, a project has been outlined to reduce environmental risks. This activity would also help to protect valued cultural and natural resources.

15. The key action to implement the NEAP and the lead agencies for its implementation are summarized in the following table. They form core of the action plan, together with the action program for enhancing environmental management. There is a project brief for each investment (justification, scope, lead agency, stakeholders, cost estimate, and time horizon) in Annex 7.

Study/Project	Lead Agency*
1. ENHANCING ENVIRONMENTAL MANAGEMENT SYSTEM Institutional & Legislative Framework 1.1 Harmonizing Institutional Authority and Procedures 1.2 Harmonizing the Legislative Framework Environment & Development Planning 1.3 Identifying Eco-basins 1.4 Local Environmental Action Planning 1.5 Making the EIA Process More Effective 1.6 Classifying and Planning Land Use Capacity 1.7 Completing & Managing Rural Cadastral Works 1.8 Preparing & Implementing National Productivity Action Plans	Prime Ministry + SPO + ME Prime Ministry + SPO + ME MoF, MARA, DSI Local governments ME GDRS Cadastry G.D. SPO/National Productivity Ctr.
2. IMPROVING INFORMATION AND AWARENESS 2.1 Managing Environmental Data 2.2 Environmental Education and Training	SIS ME + Ministry of Education
3. INVESTING IN ENVIRONMENT Urban Environment 3.1 Improving Waste Management 3.2 Encouraging Clean Technologies and Energy Sources 3.3 Upgrading Urban Slums Natural Resource Management 3.4 Upgrading Rural Environmental Infrastructure Marine and Coastal Resources 3.5 Improving Management of the Coastal Zone Cultural and Natural Heritage 3.6 Environmental Management for the GAP Region Environmental Hazards 3.7 Reducing Environmental Risks	ME + local governments MENR & Industry/Trade MPWS + local governments GDRS MPWS + local governments GAP Regional Administration MPWS + local govts.

* See "Abbreviations" section for acronyms

16. The NEAP is intended to be implemented over a 20-year period. Only short- and medium-term projects have been selected for the NEAP. Short-term is defined as a five-year time horizon and medium-term is a ten-year period. Additional measures will be identified for the second half of the NEAP period based on various inputs that are described below in the implementation strategy.

17. There is lack of sufficient data and analysis in Turkey to estimate the *potential benefits* of improved environmental management. In general, the benefits of the NEAP will include: better health for the citizens of Turkey; increased economic productivity; more efficient use of existing public sector resources and natural resources; improved sustainability of natural ecosystems; and increased amenity benefits. An indication of the magnitude of these benefits can be drawn from the existing data presented in this synthesis report. Implementation of the NEAP could achieve some of the following:

- Saving 3310 lives per year by reducing particulate matter and SO₂ levels to WHO standards;
- Reducing total health costs by \$125 million each year by the same measures;
- Conserving 1.5 billion m³ of drinking water per year if losses in the public distribution networks can be cut in half;
- Recapturing some of the one billion tons of soil and 87 million tons of plant nutrients lost each year due to erosion;
- Extending the economic life of dams and hydropower plants by reducing sedimentation;
- Saving some of the 6.7 million tons of illegally harvested wood each year by substituting fuels and increasing efficiency;
- Preserving some of the 17 species of fauna and 46 species of flora that are under threat of extinction;
- Saving some of the 1000 lives and 1% of GNP lost on average each year due to natural disasters; and
- Improving the quality of life for some of the 20 million Turkish citizens who live in illegal urban settlements.

These and other benefits will need to be further developed along with more detailed costs of the proposed NEAP actions so that either cost-benefit or cost-effectiveness analysis can be used to guide NEAP implementation.

18. To establish the legitimacy of the NEAP, the proposed *implementation strategy* includes three phases: initial implementation; monitoring and evaluation; and updating and revision. The State Planning Organization is proposed to take the lead in coordinating implementation because of its role in co-ordinating and the preparation and implementation of the Five Year plans. The steps for initial implementation of the NEAP are: 1) formally adopt the NEAP within the Government; 2) integrate the NEAP actions in the annual programs prepared by the SPO; and 3) include NEAP actions in the programs of relevant agencies and organizations.

19. Monitoring should be based on a set of indicators to be assembled by the State Institute of Statistics that report whether the NEAP's strategic objectives are being achieved; a set of such indicators is presented in Annex 8. Other important sources of monitoring information will include: (a) mid- and end-of-project reviews for all NEAP-related programs and investments which would be the responsibility of the relevant implementing agency; (b) regular NEAP performance reviews every two years; and (c) periodic Government reviews such as the preparation period for the Five Year Development Plans and meetings of the Environment High Council. Dissemination of monitoring information is recommended as public feedback is a useful resource to improve the performance of NEAP implementation. Regular and formal

evaluation should then take place by the Ministry of Environment and the SPO using these sources of information.

20. Activities for environmental protection and management require wide participation, consensus and democratic mechanisms. It may be difficult to meet these requirements by relying on administrative procedures. Thus, a mechanism for stakeholder participation in updating and revising the NEAP should be institutionalized. This will require that the mechanism be formed and its functions, participants, nature of their participation, term and duration of work, and principles of decision making be specified by a Regulation. The same Regulation should clarify the method and format for modifying the NEAP.

21. The *financing strategy* for the NEAP can be based on the following sources:

- Governmental resources - revenues from central government, local government resources, charges on publicly-provided services, other environmental fees and environmental taxes;
- Private sector support - e.g. financing by industries of their own pollution expenditures, and public-private partnerships to finance environmental infrastructure and services; and
- International financing - borrowing foreign exchange from overseas banks, credits and grants from bilateral donors and international NGOs, and grants and loans from international development agencies.

22. To execute some of the key activities identified in the NEAP, an implementation conference is proposed. Participants would include decision-makers from relevant sections of the SPO, government ministries identified as implementing agencies of projects, unions of municipalities, the Grand National Assembly which oversee the planning and budgeting process, chambers of commerce and industry, agricultural sector, bilateral donors, NGOs, and international development agencies.

THE CONTEXT of Neap

This introduction sets the context for Turkey's national environmental action plan. It begins by presenting the rationale and process for developing the Turkish NEAP.

Then, the physical, human and economic characteristics that make Turkey unique are summarized, along with the potential environmental problems that are implied by these features.

Importance and Preparation of the NEAP

0.1 In 1982, the amended Turkish Constitution stated that each (citizen) has a right to live in a healthy and balanced environment and it is the duty of both the State and citizens to upgrade the environment, protect environmental health and prevent pollution.

0.2 Since then, much has been done to achieve these goals. An Environment Act was passed in 1983, -regulations were created, and special funds were introduced for environmental protection. Also, a Ministry of Environment and an *Environment Commission* in the Turkish Grand National Assembly (TBMM) were created, environmental responsibilities were delegated to central agencies and local governments, and environmental concerns were incorporated in development plans. Three Environment Council meetings were held, *National Agenda 21* activities were carried out. Programs were launched to build public awareness about environmental issues, an approach to create sustainable development was adopted in the Sixth Five-Year Plan, and active environmental organizations emerged.

1.3 Nevertheless, the Seventh Five-Year Development Plan (SFYDP) for 1996-2000 notes that environmental concerns have not been adequately incorporated into all economic and social decisions or in legislative/organizational arrangements. Further, coordination, cooperation and division of labor is not yet achieved among organizations involved in environmental management. Nor has an environmental financing system and information/data base been introduced, and

legislative arrangements are developed enough to result in efficient environmental management.

0.4 Thus, a different approach was needed to prevent pollution and solve environmental problems, such as is embodied in the National Environmental Action Plan (NEAP), which was created after extensive deliberations among experts and stakeholders.

0.5 The NEAP offers concrete actions for integrating environmental issues and development. -Also, the NEAP will contribute to the Eighth Five-Year Development Plan (to be prepared in 1998), act as a key building block for the *National Agenda 21* being prepared with UNDP support, be a basis for discussion at the next bi-annual meeting of the Environment Council of the Ministry of Environment, and be an input to the fourth *Environment for Europe* pan-European ministerial conference in June 1998.

0.6 **Preparing the NEAP.** The document was prepared by separate groups of experts and stakeholders, meeting in two stages. The process was guided by an Executive Committee of representatives from the State Planning Organization (SPO), the Ministry of Environment and the World Bank. A Steering Committee made up of the Executive Committee plus stakeholder representatives handled organizational issues and logistics.

0.7 In stage one, nNineteen working groups produced reports and recommendations on air quality, natural, historical and cultural heritage; demography and public health; soil, water, solid waste, wastewater, marine resources, land use and coastal zone management; economic and financial issues; legal, institutional and regulatory frameworks;

education and participation; and noise pollution. The groups of experts, along with local consultants, produced working papers that were incorporated into the synthesis paper. The SPO is publishing the working papers and making them available to the public.

0.8 In stage two, stakeholders attended two conferences to rank the categories of environmental interventions (June 1996), and prioritize the experts' recommendations (November 1996), and a workshop to assess the draft NEAP synthesis report (July 1997). The conferences were attended by national and local government representatives, academics,

NGOs, members of the media, private sector, and donors (the UNDP and World Bank). ~~Representing government, the private sector, municipalities, academia and non-governmental organizations, stakeholders produced broad goals of the NEAP presented in Table 1.1 as a baseline for the NEAP, by integrating the experts' recommendations with their own views and concerns.~~ Representing government, the private sector, municipalities, academia and non-governmental organizations, stakeholders produced broad goals of the NEAP presented in Table 1.1 as a baseline for the NEAP, by integrating the experts' recommendations with their own views and concerns.

Table 1.1: Broad Goals of the NEAP

Broad Goal	Definition
Quality of Life	Quality and quantity of factors that have positive impacts on physical, spiritual, mental and cultural development, and the form and level of making use of such factors.
Awareness	Consistent and effective knowledge about the effects of information, culture, ethics and skills as well as attitudes and behavior on the protection and enhancement of environmental assets.
Management	Design, implementation, management, monitoring and supervision of legislative and institutional arrangements, sources of finance and information, techniques and technologies for the protection and development of environmental assets.
Development	Raising the level of economic, social and cultural development so as to assure the protection and improvement of the conditions of living and aesthetic characteristics of all living environments.

Between the June and November conferences, a smaller group of stakeholders grouped the 1,290 recommendations presented in the working groups' reports to 150 actions.

Another group of stakeholders subsequently ranked these actions according to whether they contributed to: (a) human health; (b) ecological balance; (c) cultural, historical and

aesthetic value; or (d) economic productivity (Annex 1).

~~Between the June and November conferences, a smaller group of stakeholders grouped the 1,290 recommendations presented in the working groups' reports to 150 actions. Another group of stakeholders subsequently ranked these actions according to whether they contributed to: (a) human health; (b) ecological balance; (c) cultural, historical and aesthetic value; or (d) economic productivity (Annex 1).~~

0.9 The groups' papers and the synthesis document should be jointly considered as the National Environmental Action Plan (NEAP). The NEAP is reviewed by the Executive Committee and the final version will be used in a conference to mobilize local and international resources for its implementation. Because of the broad participation and lengthy discussions, the stakeholders developed a sense of ownership for the document, which is the first and most critical step for implementation.

The Physical Environment

0.10 Turkey is at the crossroads linking Asia, Europe and Africa, with 97% of its total area (777,971 km²) situated in Asia. The Dardanelles and Bosphorus straits extend from Europe to Asia and create a natural connection between the basins of the Mediterranean and Black Seas. The country is surrounded by four seas and has a coastline of 8,333 km. The Aegean and Mediterranean shorelines together exceed 4,500 km. while the Black Sea coast stretches 1,700 km. and is shared with Bulgaria, Romania, Georgia, ~~and Armenia~~ ~~Ukraine~~, and ~~Russia~~. The Sea of Marmara constitutes the remainder of Turkey's coastal area.

0.11 The geological structure, topography, climate, wildlife, and plant cover are diverse and the country can be divided into four coastal units (the Black, Marmara, Aegean, and Mediterranean Seas) and three mountainous areas. Nearly 63% of the land has slopes steeper than 15% in average, even in the coastal areas. Average altitude is 1,132 m and only 10% of the country is less than 250 m above sea level. High mountains are concentrated in central and eastern Anatolia. Earthquakes, some quite powerful, occur mostly along the north Anatolian fault that runs from the Dardanelles Strait through the Eastern Black Sea mountains, paralleling the Black Sea coast.

0.12 The highly varied climate can be harsh (dry or cold), as in central, east and southeast Anatolia. Average annual temperatures can be from 4-18-~~°C degrees centigrade~~ in the central region to 18-20-~~°C degrees centigrade~~ on the southern coast. The climate is both temperate, with rain year-round, and subtropical, where summers are dry. Average annual precipitation is 770 mm., and may rise to 2,300 mm in Rize and drop to 326 mm in Kırşehir.

0.13 Overall, the country is well-endowed with natural resources, such as lignite, coal, iron, copper, chrome, magnesite, boron, and salt, and more modest amounts of oil and natural gas. Although somewhat unevenly distributed, water is plentiful and offers a ready supply for drinking, irrigation, industrial development, and hydropower generation. Forests cover about 26% of the land mass, but over half the area is degraded and unproductive. Finally, because the country is surrounded by water, fish supplies are diverse, but only 10% have economic value and catches are modest. The mountainous terrain restricts agricultural development; only 24% of the surface area is suitable, and nearly three-quarters of it is prone to erosion. A fourth of

the land is suitable for agriculture. The physical landscape is closely linked to environmental conditions:

- Turkey's location translates into rich biodiversity, sensitive ecological habitats and a wealth of cultural and historical resources;
- The extensive shoreline and access to four seas creates difficulties for managing coastal zones and marine resources;
- Earthquakes are an important natural hazard;
- The mountainous and steeply sloped topography causes soil erosion and require special agricultural techniques;
- Regionally-specific, heavy rainfall raises the risk of landslides and floods, while aridity combined with human activity, hastens desertification;
- Uncontrolled exploitation of mineral resources causes landslides, contaminates groundwater, and threatens the safety of miners; and
- Significant hydrological resources present opportunities for water management, but create environmental concerns.

Human Resources

0.14 **Population.** ~~According to 1997 census, the population 62.6 million which is growing at an annual rate of 1.6% - the highest of all OECD countries. From 1980-1994, the average growth of population in OECD~~

~~countries was 12%, while Turkey's population increased by over 35% (OECD, 1996). According to the projections of SIS and SPO, the population estimate is 63.7 million for 1997, with an annual rate of 1.6% - the highest of all OECD countries (OECD, 1996).~~ From 1980-1996, the annual average growth rate of population in OECD countries (excluding Turkey) was 0.7 per cent while the annual average growth rate of Turkey was 2.1%. Population density is also increasing rapidly. The figure of 58 persons per km² in 1980 is estimated to have swelled to 86~~4~~ in 1995 (SIS, 1996~~7~~). The State Institute of Statistics (SIS) projects that the population will rise to ~~66.869.7~~ million in 2000, and annual growth rates will drop to 1.5% (SIS, 1995).

0.15 **Urbanization** The population is also urbanizing rapidly. While the average annual urban growth rate dropped from 4.9% during the 1980s to 4.4% during 1990-95, it is still more than double the average urban growth rate (2.3%) for all lower middle-income developing countries (World Bank, 1997~~a~~). This implies significant rural-urban migration. In 1990, 54~~9~~% of the population lived in urban settlements, ~~4239~~% of which were concentrated in four provinces (Istanbul, Ankara, Izmir, and Adana) (Yücel, A., 1994). It is expected that by 2000, ~~70~~% of the population will live in urban areas, with over a third located in settlements of more than one million people (SPO, 1995~~a~~).

0.16 **Education.** According to the 1990 census, 80% of Turkey's population is literate, although males have a higher literacy rate (by 15%) than females (SIS, 1997). Of the literate population, 20% had no formal schooling, 57% graduated from primary school, 9% from middle school, 10% from high school or its equivalent, and 4% from a college or university (SIS, 1997). In the poorer provinces of Eastern Anatolia, only 50% of girls attend school and the number of years of school attendance is half that of

males (World Bank, 1997a). –About 9,000 non-formal education and training institutions, such as technical schools for girls, maturation institutes, occupational training centers, adult education centers, practical arts schools, apprenticeships and adult technical training centers educate about three million individuals a year, 57% of whom were females. Religious institutions, professional organizations, public and private agencies and voluntary organizations also provide non-formal education and training.

1.17 Health and basic infrastructure. Average life expectancy for women rose from 64 years in 1980 to 70 in 1995 and for men, from ~~61.59~~ to 66, which indicates overall improvement in health conditions. These figures are slightly better than the 1995 average figures for lower middle-income countries which have life expectancies of 70 years for women and 64 years for men. The under-five mortality rate is also better in Turkey, at 52 per 1,000 in 1995 (Ministry of Health, 1996) compared to 56 per 1,000, the average of other lower middle income countries. Still, malnutrition among children is a serious problem, with 20% listed as stunted (World Bank, 1997a). However, disparities in Turkey are glaring. Infant mortality rates in parts of the most deprived, rural eastern provinces are about double those in some of the western provinces. Tobacco consumption climbed from an average of 2.0 kg annually per adult (for the 1984-86 period) to 2.2 kg in 1995, or 10% above the world average (World Bank, 1997a), creating an increased health hazard.

0.18 The extent of basic infrastructure in poorer regions is well below that in the more developed regions. Only 63% of the rural population in southeast Anatolia has access to clean drinking water compared to 86% in Marmara. Due to these factors, the environment could deteriorate more quickly, unless preventive and mitigating measures

are implemented. Relatively high population growth rates intensify pressure on the land, water, groundwater, flora, and fauna, and produce more waste, which then pollutes the air and watersheds. Also, rapid urbanization exposes more of the public to environmental problems, usually pronounced in informal settlements, and the supply of environmental infrastructure and services cannot keep up with demand. Further, along with land development, such growth can diminish fertile agricultural land, forests, and sensitive habitats.

The Economic Development and the Environment

Economic Trends Since the 1980s

0.19 From 1980-1994, steps were taken to open the economy to competition, liberalize foreign trade, determine prices through market forces, restructure domestic financial markets, and facilitate the movement of international capital (SPO, 1995a). As a result, industrial targets were largely achieved, the level of capacity utilization was raised, and the share of industrial goods in exports rose along with the share of exports in GNP. State subsidies for agriculture were largely curbed and the share of agriculture in ~~GDP~~ fell to 15.54% by 1994.

0.20 By 1996, the fiscal deficit doubled in real terms to 9.18.2% of GDP, fueling an unsustainably rapid pace of economic expansion, with real GDP growth of 7% and annual inflation of 75.89% (World Bank, 1997a). Thus, the Government announced an ambitious fiscal program for 1997 to balance the budget through large increases in tax revenues and privatization receipts. ~~However, these goals will most likely not be met and Government spending will probably exceed planned outlays due to the rapidly~~

growing deficit of pension funds, and pressures for increased public sector salaries and agricultural subsidies. However, expected revenues from privatization and other assets fell short of the targets, while non-interest expenditures rose sharply. Hence, budget deficit stood at 7.5% of GNP in 1997. Primary budget surplus, on the other hand, declined to 0.3 percent from 1.7 percent.

0.21 Recent estimates put GNP per capita at US\$2,999 in 1997 (SPO, 1997²), and the broader measure of wealth, recently formulated as an indicator of sustainable development by the World Bank, gives Turkey a per capita wealth of US\$78,530 in 1994 (World Bank, 1996). Eighty percent of this valuation is attributed to human resources, 14% to produced assets and 6% to

natural capital. Except for 1994, the economy has grown rapidly, expanding at double the average for OECD countries. GDP increased by 80% from 1980-94 while the OECD average was 40% for the same period (OECD, 1996). The industrial sector consistently exhibits the highest growth rate which creates increasing environmental issues and agriculture the lowest. Table 1.2 shows economic indicators and structural changes in the Turkish economy from 1992-1996. Tourism is an important growth sector, emphasizing the need to preserve historical and cultural sites. About 9.6 million tourists visited in 1997⁶, contributing \$7.05.8 billion in revenue and making Turkey the 19th most important tourist destination worldwide. The Association for Turkish Tourism Investors has targets of 20 million visitors and \$15 billion in revenues by the year 2006.

Table 1.2: Turkey's Economic Structure and Development

<u>Indicators</u>	<u>1992</u>	<u>1993</u>	<u>1994</u>	<u>1995</u>	<u>1996</u>	<u>1997^(e)</u>
<u>Population (millions) (1)</u>	<u>58.4</u>	<u>59.5</u>	<u>60.6</u>	<u>61.6</u>	<u>62.7</u>	<u>63.7</u>
<u>GNP (at current prices, trillion TL) (2)</u>	<u>1103.6</u>	<u>1997.3</u>	<u>3887.9</u>	<u>7854.9</u>	<u>14978.</u>	<u>29054.</u>
					<u>1</u>	<u>5</u>
<u>GNP (at 1987 prices, trillion TL) (2)</u>	<u>90.3</u>	<u>97.7</u>	<u>91.7</u>	<u>99.0</u>	<u>106.1</u>	<u>112.5</u>
<u>Per capita GNP (US\$) (2)</u>	<u>2744</u>	<u>3056</u>	<u>2161</u>	<u>2788</u>	<u>2944</u>	<u>2999</u>
<u>Average rate of growth (at 1987 prices, %) (2)</u>	<u>6.4</u>	<u>8.1</u>	<u>-6.1</u>	<u>8.0</u>	<u>7.1</u>	<u>6.0</u>
<u> Agriculture</u>	<u>4.0</u>	<u>0.8</u>	<u>-0.7</u>	<u>2.0</u>	<u>4.4</u>	<u>-2.8</u>
<u> Industry</u>	<u>6.3</u>	<u>8.3</u>	<u>-5.7</u>	<u>12.1</u>	<u>7.1</u>	<u>9.5</u>
<u> Services</u>	<u>7.2</u>	<u>10.5</u>	<u>-6.6</u>	<u>6.3</u>	<u>7.6</u>	<u>7.0</u>
<u>Sector shares in GDP (%) (2)</u>						
<u> Agriculture</u>	<u>15.0</u>	<u>15.4</u>	<u>15.5</u>	<u>15.7</u>	<u>16.9</u>	<u>15.8</u>
<u> Industry</u>	<u>25.6</u>	<u>24.5</u>	<u>26.4</u>	<u>26.3</u>	<u>25.2</u>	<u>25.5</u>
<u> Services</u>	<u>57.8</u>	<u>59.0</u>	<u>58.2</u>	<u>58.0</u>	<u>58.0</u>	<u>58.7</u>
<u>Exports FOB (Billion \$) (3)</u>	<u>14.7</u>	<u>15.3</u>	<u>18.1</u>	<u>21.6</u>	<u>23.2</u>	<u>26.2</u>
<u>Imports CIF (Billion \$) (3)</u>	<u>22.9</u>	<u>29.4</u>	<u>23.3</u>	<u>35.7</u>	<u>43.3</u>	<u>48.6</u>
<u>Annual change in consumer price index</u>	<u>66.0</u>	<u>71.1</u>	<u>125.5</u>	<u>76.0</u>	<u>79.8</u>	<u>99.1</u>

Annual change in wholesale prices index	<u>61.4</u>	<u>60.3</u>	<u>149.6</u>	<u>65.6</u>	<u>84.9</u>	<u>91.0</u>
--	-------------	-------------	--------------	-------------	-------------	-------------

(e): Estimate dated October, 1997 except for foreign trade and prices.

Sources: (1) SIS, **The Population of Turkey, 1923-1994**, Ankara, 1995.
(2) SPO, **1998 Annual Program**, Ankara, 1997.
(3) SPO, **Main Economic Indicators**, Ankara, January 1998.

Sources: (1) TC Maliye Bakanlığı, **1996 Yıllık Ekonomik Rapor**, Ankara, 1996.

(3) İGEME, **Türkiye'de Üretim, İhracat, Kapasite Karşılaştırması ve Dünya Ticareti ile Mukayesesi**, Araştırma ve Geliştirme Dairesi, 1996, Ankara.

(2) TC DIE, **Türkiye İstatistik Yıllığı 1996**, Ankara, 1997.

(4) SPO, **Ekonomik ve Sosyal Göstergeler (1950-1997)**, Ankara, 1997.

(6) SPO, **1998 Annual Program**, Ankara, 1997.

(2) SPO, **Main Economic Indicators**, Ankara, January 1998.

0.22 However, development has been uneven between (i) regions and (ii) socio-economic groups. While overall GNP increased by 22% from 1987-1994, it grew by 10% in Eastern Anatolia compared to 27% in the Aegean region (Özsüca, 1996). As a result, the difference in GNP per capita is more than three-fold in these two regions as shown in Table 1.3. Income per capita is also highly skewed among provinces, ranging from the lowest in Ağrı (\$604) to the highest in Kocaeli (\$7,048) in 1994.

Formatted: Bullets and Numbering

Formatted: Bullets and Numbering

Table 1.3: Economic Status of Regions (1994)

Source: Şerife Turcan Özsüca, "Türkiye'de Sanayileşmenin Yapısı: Bölgesel Analiz (1987-1994)" **İktisat, İşletme ve Finans**, Aralık 1996, Ankara

Regions	GNP Growth 1987-1994 (%)	Share in GNP (%)	Per Capita GNP (Million TL at 1987 prices)
<u>Mediterranean</u>	<u>25</u>	<u>12.2</u>	<u>1 452</u>
<u>Eastern Anatolia</u>	<u>10</u>	<u>3.8</u>	<u>661</u>
<u>Aegean</u>	<u>27</u>	<u>17.2</u>	<u>1 918</u>
<u>Southeastern Anatolia</u>	<u>26</u>	<u>5.4</u>	<u>853</u>

<u>Central Anatolia</u>	<u>17</u>	<u>16.3</u>	<u>1 428</u>
<u>Black Sea</u>	<u>15</u>	<u>9.4</u>	<u>1 063</u>
<u>Marmara</u>	<u>23</u>	<u>36.6</u>	<u>2 169</u>
<u>TOTAL/AVERAG</u>	<u>22</u>		<u>1 507</u>
<u>E</u>		<u>100.0</u>	

Source: Serife Turcan Özsuca, "Türkiye'de Sanayileşmenin Yapısı: Bölgesel Analiz (1987-1994)", İktisat, İşletme ve Finans, Aralık 1996, Ankara

1.23 Similarly, income distribution remains highly uneven between socio-economic groups. –Despite an improving equity trend since the 1980s, the top fifth of the population still receives half of the national income while the poorest fifth receives only 5% as shown in Table 1.4. While this imbalance principally stems from the structure of ownership, it has

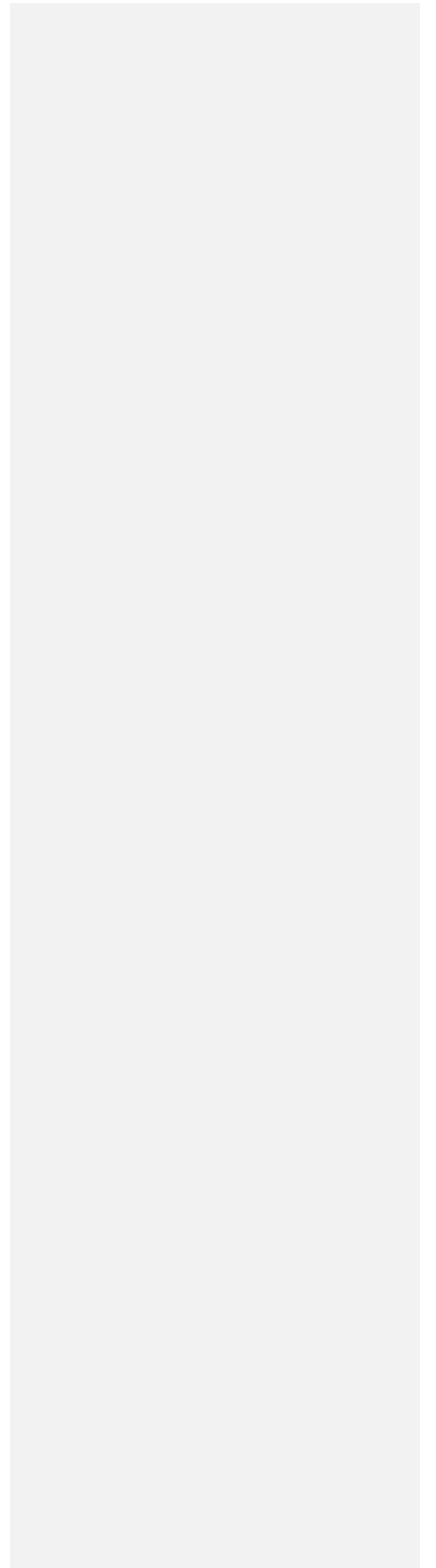
been consolidated by (i) rapid working population growth; (ii) a downward trend in real wages and salaries; (iii) interest rate hikes; (iv) high inflation and devaluation rates; (v) drop of tax revenues in the GNP;(vi) rise of indirect to total tax revenues ratio; and (vii) public spending policies.

Table 1.4: Income Distribution by Socio-Economic Quintile

Sources: 1) SPO, Gelir Dağılımı 1973, Sosyal Planlama Dairesi, Ankara
2) SIS, 1987 Hanehalkı Gelir ve Tüketim Harcamaları Anketi Sonuçları, Gelir Dağılımı, Ankara.

<u>Household Percentiles</u>	<u>Income Percentiles</u>				
	<u>1963(1)</u>	<u>1968(2)</u>	<u>1973(1)</u>	<u>1987(3)</u>	<u>1994(4)</u>
<u>Lowest 20%</u>	<u>4.5</u>	<u>3.0</u>	<u>3.5</u>	<u>5.2</u>	<u>4.86</u>
<u>Second lowest 20%</u>	<u>8.5</u>	<u>7.0</u>	<u>8.0</u>	<u>9.6</u>	<u>8.63</u>
<u>Middle 20%</u>	<u>11.5</u>	<u>10.0</u>	<u>12.5</u>	<u>14.1</u>	<u>12.61</u>
<u>Second highest 20%</u>	<u>18.5</u>	<u>20.0</u>	<u>19.5</u>	<u>21.2</u>	<u>19.03</u>
<u>Highest 20%</u>	<u>57.0</u>	<u>60.0</u>	<u>56.5</u>	<u>49.9</u>	<u>54.88</u>

Sources: 1) SPO, Gelir Dağılımı 1973, Sosyal Planlama Dairesi, Ankara
2) SIS, 1987 Hanehalkı Gelir ve Tüketim Harcamaları Anketi Sonuçları, Gelir Dağılımı, Ankara.
3) SIS, Hanehalkı Gelir ve Tüketim Harcamaları Anketi Sonuçları 1987, Gelir Dağılımı, Ankara, 1990
4) SIS, Hanehalkı Gelir ve Tüketim Harcamaları Anketi Sonuçları 1994, Gelir Dağılımı, Ankara, 1997.



0.24 Official unemployment is relatively low, dropping from 8% in 1992 to 6.3% in 1996 (SPO, 1997), although female labor force participation plummeted from nearly 70% in the mid-1950s to 32% in 1995. 48% of the economically active population were employed in agriculture, forestry, hunting and fishing in 1995 (SIS, 1997), although these sectors accounted for only 15.7% of GNP (SPO, 1997). Altogether, 78% of men and 43% of women were classified as economically active, with 61% of those over 12 were counted as employed. Sixty percent were classified as “self-employed” or “unpaid domestic labor.”

Economic Policies

0.25 At the policy level, recent fiscal and budgetary packages, pricing, trade liberalization, divestiture of state-owned enterprises and regional programs have bearing on environmental quality. It will be crucial to incorporate environmental planning into development programs, if growth is to be sustained. Among other aspects, plans should include privatization, economic incentives to use less of polluting materials, and a review of policies that lead to pollution.

- **Fiscal and budgetary policies.** Fiscal weaknesses have led to deficits for the ~~public sector~~ ~~three main social security institutions~~. This affects employment, savings levels, social and economic equity, efficiency, the predictability of tax revenues, and environmental expenditures. Since 1993, the Government has passed legislation to improve tax policies and administration. However, some taxes distort consumption habits that negatively affect the environment. For example, until October 1997 the consumption tax on leaded and unleaded gas was the same, resulting in a higher price for the unleaded gas, which discouraged motorists from switching to the cleaner fuel. At the local level, governments continually have difficulty funding environmental services due to low property tax rates, limited enforcement power, tax evasion, and the very low level of private contribution required for cost-sharing projects (just 2% of property value). The most important environmental fee is the cleansing tax, which is used mainly to manage solid waste. However, as it is inadequate and adjusted for half the inflation rate, it is affecting the quality of service. In budgetary allocations, transportation investments accounted for 30% of total public investment in the SFYDP Period. These investments support a transport network primarily based on roads and motorized vehicles creating a need to address environmental issues related to transportation.
- **Pricing policies.** Agricultural support policies have been problematic, as they have distorted economic incentives, affected the fiscal deficit, and mainly benefited large farmers and only 10% of intended beneficiaries have been reached. To remedy the situation, the Government plans to gradually remove the pricing support, which will also allow it to conform to World Trade Organization and EU agricultural policies. Further, it plans to remove price supports for agricultural products. Instead, these will be replaced by direct income support to target groups. Also, it intends to gradually phase out subsidies for inputs and price energy more appropriately. Despite these intentions, little has been done to date. In fact, some policies were reversed during last two years, as the Government increased the fertilizer subsidy creating a potential for uneconomic and environmentally harmful use of fertilizers. However, policies followed starting from 1998, are promising in the sense of phasing out fertilizer subsidies.

- **Trade liberalization.** Trade liberalization has expanded regional trade (largely through a customs union with the EU on January 1, 1996) and generally opened up trade opportunities in international markets. Indeed, it is expected that continued free access to large, stable EU markets, and reduced tariff and import duties will raise exports and enhance competition in domestic markets in the longer term. As a result of this economic integration, pressure will undoubtedly grow for Turkish goods to meet international environmental standards.
- **Divestiture.** State-owned enterprises have been a major drain on the budget and the economy for years because of low productivity, allocative inefficiency and a heavy fiscal burden. The Government's primary policy instrument for tackling this problem is divestiture through privatization and closure. The privatization process might be an effective tool for better definition of environmental liabilities. While the legal and administrative mechanisms are in place, implementation has been ad-hoc. Legal and political challenges have repeatedly disrupted the process and there has recently been an excessive focus on using proceeds to finance the budget deficit.
- **Regional policies.** The Government recently created a Regional Development Program for 38 relatively less-developed provinces with a population of 5.2 million (1990 census). It includes special employment packages, plans to target public funds for social and environmental needs, and incentives to attract private investment. The Southeast Anatolia Project (GAP) within the program will have substantial environmental implications, due to the construction of 22 dams and 19 hydroelectric plants, it will expand irrigation from 4.6 million hectares of land to 6.2 million hectares, and generate much more power. It is expected this will also cause the population to increase to over 9 million by 2005 (a 35% hike).

Environmental Implications

0.26 In Turkey, as elsewhere, rapid economic growth has accelerated the pace of urbanization and consumption of natural resources as well as increased the amount of waste generated. At the same time, income growth combined with urbanization is also reducing pressure on some rural resources while increasing the intensity and exposure to urban pollution. Although an economic downturn temporarily diminished some of the problems, it also resulted in the increased extraction of resources, intensified pressure on marginal lands, hampered the adoption of environmental regulations (due to budget cutbacks), and caused firms to reduce pollution controls. Poverty, caused by income inequity among regions and socioeconomic groups, has been linked by numerous international studies to accelerated environmental degradation and increased vulnerability to environmental risks (e.g., Leonard, 1988; World Bank, 1992; Mega-Cities, 1994; Moser, 1996).

1.27 Budgetary priorities, energy pricing, agricultural subsidies, strengthening of local government through reform of municipal finance, regional policies, and limitations on polluting products have significant environmental linkages. For example, the concentration of investment in motorized transportation has important implications for air pollution, public health and safety.

The GAP project implies a range of positive and negative environmental impacts associated with dams, demographic change, irrigation, and increased availability of domestically

produced hydroelectricity. Accelerated privatization, combined with environmental requirements, is prone to reducing pollution as state enterprises are generally more polluting than their private sector counterparts. Privatization will also stimulate the development and application of environmental liability regulations. –Full implementation of the –Customs Union can increase pressure for enforcement of European standards of environmental quality.

0.28 Structural changes in the economy are affecting environmental quality. Rapid energy sector development to meet growing demand will take a toll, the precise nature of which will depend on whether Turkey expands the use of natural gas, coal or nuclear power, or instead emphasizes energy efficiency (reducing power losses) and renewable energy. Tourism is rapidly increasing, particularly in coastal areas, which threatens natural heritage sites and marine quality. The concentration of employment in the agricultural sector, despite its low economic returns, suggests heightened human pressure on soil, water, wildlife, and fisheries. –Damage to fish hatcheries may be occurring due to shoreline damage from 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. Environmental problems linked with low incomes and an inability to pay for better and cleaner services also persist. This may improve with urbanization and greater employment opportunities in the industry and service sectors.

2. ENVIRONMENTAL MANAGEMENT

Turkey's environmental management system and institutional base were both in place before the 1992 Rio Declaration and Agenda 21 which set forth important changes in environmental protection policies, and management systems. Therefore, it has been necessary to harmonize national environmental policies with approaches adopted by such international documents. This chapter reviews national environmental policy and international activities; the legal, regulatory and monitoring framework; the institutional setting; principal managerial instruments; and constraints to effective environmental management and their consequences.

A. *Environmental Policies and International Activities*

2.1. National environmental policy was first articulated in the Third Five Year Development Plan¹ (TFYDP). It was previously developed by separate public organizations, especially local governments, so it was not national in scope. It was later felt that policies alone were not sufficient to prevent and eliminate environmental problems. Following this realization, there was recourse to special constitutional, legal, institutional, and technical arrangements for addressing environmental problems. Also, efforts were initiated to get existing public agencies, private organizations and individual citizens to plan and implement their activities integrating a concern for protection of the environment.

2.2 The Seventh Five Year Development Plan² (SFYDP) currently embodies national policy in all key sectors, including the environment. Its major Objectives, Principles

and Policies under the heading "Protection and Improvement of the Environment" include :

- ◆ Emphasizing pollution prevention rather than clean-up;
- ◆ Using an appropriate combination of economic and regulatory instruments;
- ◆ Developing regional and eco-basin strategies;
- ◆ Strengthening the system of environmental management;
- ◆ Ensuring that policies and solutions are in accordance with EU norms and international standards;
- ◆ Revising and enhancing the financing system for environmental protection, management and improvement;
- ◆ Promoting environmental awareness through formal and non-formal channels; and
- ◆ Harmonizing legislation to ensure compatibility between economic development and environmental protection.

2.3 The instruments to implement these policies are a priority project entitled

¹1973-1977

²1996-2000

“Institutional Arrangements on the Environment” and the preparation of a “National Strategy of the Environment” (the NEAP). SPO is responsible for monitoring policy implementation as well as the institutional project. As the SFYDP was only initiated in 1996, it is too early to assess the effectiveness of policy and project implementation.

2.4 By 1997, Turkey had become party to 38 conventions, signed 29 declarations and enacted 15 bilateral agreements on environmental protection and management, which, according to the Constitution, have the “effect of law”. These **international commitments** are listed in Annex 2. ~~—In addition, the country hosted a 1996 meeting on climate change, and~~ the National Assembly is considering the approval of anti-desertification convention.

2.5 The country participates in various **regional initiatives** such as the Mediterranean Environmental Technical Assistance Program (METAP), the Mediterranean Action Plan, Black Sea Environmental Program and Regional Agenda 21. ~~—To date, METAP has supported projects on solid waste management, institutional strengthening of the Ministry of Environment (ME), coastal zone management, and environmental finance. Also, METAP was recently asked to support five new projects for 1996-2000. Further, Turkey is (a) monitoring marine water quality in compliance with MEDPOL Phase III; (b) preparing an investment portfolio to minimize land-based sources of pollution; and (c) helping prepare an Agenda 21 plan for the Mediterranean. It also hosts a Pollution Prevention and Program Coordination Unit and the **Regional Activity Center for Routine Pollution Monitoring.** Finally, it began preparing the Regional Agenda 21 together with the Central Asian~~

and Balkan countries’ environment ministries.

B. LEGAL, REGULATORY, AND MONITORING FRAMEWORK

202.6 Legislation. Turkey’s environmental legislation includes the **1982 Constitution**, the **Environment Act** and various other laws that affect the environment³ (see Annex 3). The Constitution states that citizens and Government are obliged to cooperate to protect and upgrade the environment. It also addresses the need to protect the shores, land and water resources, forests, and natural, historical and cultural assets. As protection and development can only be achieved with relevant authority, the document authorizes enforcement powers. ~~—The **Environment Act (No 2872) of 1983** embodies the *polluter pays principle* adopted by other countries, and sets forth the concept of *absolute liability* to operationalize it. —It also defines activities to prevent and solve environmental problems. These involve banning certain polluting operations, requiring environmental impact assessments (EIAs) for specific activities (effective in 1993), identifying sensitive locales to be defined as *special environmental protection areas*, providing sanctions to prevent the discharge of hazardous chemical substances and wastes, banning noise, promoting incentives to pollute less, creating an environmental fund, and securing —participation in decision making bodies such as the Environment~~

³ Other legislation that affects the environment includes: the Water Act, Water Products Act, ~~—Municipalities Act, General Hygiene Act, —Poisonous Gases Act,~~ Tourism Incentives Act, Protection of Cultural and Natural Assets Act, National Parks Act, Forest Villages Development Act, Bosphorus Act, Metropolitan Municipalities Act, Agricultural Reform Act, Game Act, Urban Development/Construction Act, Mining Act, Coastal Act, Reforestation and Erosion Control Act, ~~—State Hydraulic Works Act,~~ and Forest Act.

Council (ENC), Higher Council for the Environment (HCE), and Local Environment Committees (LECs) (see Institutional Setting below). To this end, amendments are now being considered that could strengthen inspections, broaden public participation, promote more efficient collection of revenues that support the Environmental Pollution Prevention Fund, and better protect drinking water resources.

2.7 Regulatory mechanisms, Command and control activities, as defined in the Environment Act, are the primary tools for managing the environment. Regulations specify procedures to be followed, plans to be prepared, standards to be met, and activities to be prohibited. Also, enforcement powers are assigned to agencies, fines and other penalties are specified, and monitoring is promoted to ensure compliance. Few economic instruments are discussed, although, as mentioned above, the Act adopts a polluter pays principle and the SFYDP calls for appropriate economic and regulatory approaches.

2.8 **Standards.** Turkey has many of the elements needed to monitor and enforce its environmental policies, laws and regulations. For example, air pollution standards, based on German norms, were set by the Ministry of Environment (ME) in 1986. The 1988 Water Pollution Control Regulation presented the principles for classifying inland water resources as well as discharging and treating wastewater. The 1986 Noise Control Regulation set maximum levels of noise for indoor and outdoor spaces as well as mitigation measures. More recently, a number of regulations on waste management were approved, including those on solid waste (1991), medical waste (1993), toxic chemicals and their products (1993), and hazardous waste (1995), based on West European norms (see Annex 4 for details).

2.9 Other environmental standards are set by the Turkish Institute of Standards (TIS). Recently, the TIS formed an Environmental Standards Preparatory Group, thereby widening the scope of its activities. Most of these standards relate to specific problem areas (such as waste, air and water quality, forest conservation, erosion control, and soil conservation). In addition, guidelines under the International Standards Organization (ISO) 14000 on environmental management and the EU's Eco-Management and Audit Scheme (EMAS) were translated into Turkish, and disseminated to the private sector. At present, TIS staff are being trained to conduct audits.

~~2.2.30~~ **Monitoring and enforcement.** The ~~MoHE~~ is responsible for monitoring ~~controlling~~ air pollution. One hundred thirty-five monitoring stations under MoH in 74 Turkish cities gather data on SO₂ and particulates. MoH grants permits to industries for stack gas emissions. ME. It also grants permits to municipalities and industries to discharge wastewater and monitors/enforces the regulation on EIAs. The ME's Agency for the Protection of Special Areas is responsible for monitoring and regulating 12 specially protected areas. Metropolitan municipalities or provincial governorates, wherever appropriate, in consultation with LEC's grant permits to municipalities and industries to discharge wastewater.

~~2.2.11~~ The State Hydraulic Works (DSI) and Electricity Survey Administration (EIE) are responsible for creating and applying water quality and quantity measurements, although data are not available for all types of aquatic environments. The highest local office (municipal, village or special provincial administration) is responsible for implementing noise control regulations. The Ministry of Forestry implements national park legislation, and the Ministry of Culture

monitors and manages cultural, natural and historic assets.

22.12 Enforcement involves fines, imprisonment, factory closings, or prohibitions on the right to build or operate facilities, and violators can appeal such actions in the courts. In general, municipalities and Government agencies monitor compliance with regulations, and the provincial government handle enforcement. However, because no comprehensive information exists on compliance rates, effectiveness of enforcement procedures, outcomes of court challenges, or revenues raised through environmental fines, it is impossible to assess the effectiveness of the enforcement system.

C. INSTITUTIONAL SETTING

22.13 **Central/Regional.** Given the magnitude of environmental problems, national institutions were created to identify, improve, coordinate, monitor and supervise activities, as well as procure resources. The first was a Permanent Board of Consultants for Environmental Problems, in the early 1970s. Then, in 1978, an Environment Organization was attached to the Prime Minister's office, as was a General Directorate of Environment in 1984, which was transformed into the Undersecretariat of Environment in 1989.

22.14 **The Ministry of Environment** was established by government Decree no. 443 in 1991, which empowers it to conduct activities to protect and improve the environment. These activities involve ensuring appropriate land use, protecting natural resources, plants and animal species, and preventing pollution. Its duties include drafting laws, preparing rules and internal regulations, creating institutions (such as village environment associations and commissions to manage waste), supervising and planning environmental designs,

interventions and actions as appropriate, managing watershed water quality and regional waste, creating environmental policies and strategies, coordinating environmental activities at international and national levels, conducting research, applying measurements, monitoring compliance, collecting data, managing finances, and carrying out extension and training. The ME has special consultative organs at three levels to ensure the participation of people in line with the requirements of environmental protection and development activities: The Environment Council (ENC)⁴, the Higher Council for the Environment (HCE)⁵, and

⁴ Its basic objective is laid down as "ensuring the utilization of the ideas, information and experience of other ministries, industrialists, voluntary organizations, professional organizations and individuals of reputed scientific background on issues related to the environment." The ENC is supposed to convene, under ordinary conditions, once in two years upon the call and agenda of the Minister of Environment. It embodies representatives from relevant ministries and their attached organizations, established by special laws, public and private industrial enterprises, professional and voluntary organizations, universities, and local governments. The ENC convened three times until end of 1996.

⁵ Its tasks are: "a) to set targets for environmental protection, pollution prevention, and the replenishment of diminishing stocks with a view to relevant international agreements; to carry out investigations on proper measures to materialize these targets and monitor related activities; b) to lay down principles governing what kind of facilities can be constructed and where in special preservation areas; and on licenses for the allocation of immovable property and buildings; c) to determine other principles which will govern actions related to areas demarcated as special preservation areas; d) to determine principles governing, in general, the approach to environmental issues; and to conduct discussions and surveys according to agenda shaped by the Ministry" The HCE convenes at least two times a year with the participation of representatives from: SPO, Undersecretaries of relevant ministries, Head Office for Religious Affairs, STRIT, Nuclear

Local Environment Committees (LECs)⁶. At the provincial level, there are "Provincial Directorates of Environment" which, as of 1995, were organized in 33 provinces. The National Assembly is considering proposals to reorganize the ME's structure to improve efficiency; the draft reorganization of ME includes establishing a Sustainable Development Council, increasing public participation, allowing for more flexible hiring of experts, and improving salaries to attract more qualified personnel (see Annex 5).

2.15 The Agency for the Protection of Special Areas (APSA), attached to the ME, works on Ecological Management Plans for 12 special environmental protection areas, identified by the Council of Ministers (1988-1990). APSA is organized as a Special Environmental Preservation Council with departments at the

Energy Agency of Turkey (NEA), 2 academicians to be selected from universities by the ~~Higher~~ Council for Education, Union of the Chambers of Trade, Industry, Maritime Trade and Commercial Exchange, and the Union of the Agricultural Chambers of Turkey. Within the ~~organizational~~ ~~organisational~~ structure of the HCE, there is also a Technical Committee for Environment composed of the Undersecretary of the ME and senior level officials of the related ministries to conduct preliminary preparations on the items included in the agenda of the HCE.

⁶ According to Article 30 of the Decree no. 443, the LECs are formed in each province to meet once a month under the chairmanship of the Provincial Governor, and with the attendance of the provincial representatives of the related ministries, the Mayor of Greater Municipality, the Mayor, Chairpersons of the Chambers of Industry and Agriculture, and the representatives of the ME. The LECs generally conduct activities for the local ~~materialization~~ ~~materialisation~~ of overall policies designed by the ME. But it is also among the duties of the LECs to "identify provincial level environmental problems and report to the Ministry together with proposals for solution."

center, and directorates at regional and branch levels. Its duties include preparing and revising environmental regulations specific to these areas and land use plans, conducts research, and runs training courses.

2.16 The State Planning Organization (SPO) ~~under~~ ~~in~~ the Prime Minister's Office develops economic, social and ~~and~~ ~~applies~~ environmental policies for the Government agencies; 5-year development plans; and prepares annual programs and public investment programs. It approves all public investment projects as well as those proposed by municipalities for financing by either domestic or foreign resources. One of its units, the Local Authorities, Environment and Technological Research Department, formulates environmental policy recommendations for the 5-year plan, evaluates ME's investment projects and programs, and prepares annual environment programs. However, the SPO does not evaluate sectoral investments for their compliance on environmental policy. Higher Council for Planning (HCP) chaired by the Prime Minister, is responsible for decision making on macroeconomic and social policies and evaluation and allocation of resources for big investment projects. Ministers for agriculture, forestry, energy, transport, settlements, finance and undersecretary of SPO are the members of HPC, but not the Minister for Environment.

2.17 The Act on Preservation of Cultural and Natural Entities created a central and regional committees on immobile Fixed ~~c~~ Cultural and ~~n~~ Natural ~~e~~ Entities (Higher Council for Preservation of Cultural and Natural Entities) whose aim is to ensure that entities classified by the Act are preserved. The Central Council sets broad policies and guidelines for the regional councils, including their geographical jurisdiction. In turn,

regional councils approve these plans, designating locales with special features as "site areas," identifying preservation areas, and deciding whether construction is viable.

22.18 The Ministries of Agriculture, Forestry, Health, Culture, Energy and Natural Resources, Industry and Trade, and Tourism all have environmental responsibilities, while specialized agencies that have an environmental focus include the **State Hydraulic Works (DSI), Electricity Survey Administration, Hygiene Institute, GAP Regional Administration, and General Directorates of Forestry and Rural Services.**

22.19 **Local governments.** Municipalities produce infrastructure and services for protecting and managing the environment.⁷ They are legally responsible for managing solid waste, installing and operating water, gas, and urban transport services, and constructing and repairing streets. -Although sewerage and bus services are not specified among municipal duties, they have been assumed in practice. Further, municipalities have an important planning role, as they are responsible for approving structure and implementation plans that affect all forms of development within their boundaries.

22.20 Since 1980, some municipalities have privatized solid waste management, street cleaning, property tax collection, and public transport services. Municipalities have also established public utilities to provide water supply and sewerage services. Where privatization and corporatization of municipal services have occurred, services and access have usually improved.

⁷ As of March 1998, -According to 1995 data, Turkey has 2,835,767 municipalities (15 of which are metropolitan governments), 8079 special provincial administrations, and 36,870 5,343 villages (SIS; TUSIAD, 1996).

22.21 **Private sector.** The private sector is a key environmental actor, as its enterprises generally perform better than parastatals, treating almost twice as much of their wastewater and spending less than half as much for final disposal. Parastatals generate more than half the industrial solid waste, and industrial discharges of BOD and COD. -This implies that accelerated privatization of state enterprises, combined with appropriate environmental safeguards and requirements, could reduce industrial pollution. As private enterprises also provide environmental goods and services, they maintain expertise and supply equipment for wastewater treatment, water purification, solid waste management, air pollution control, and EIAs. Some manufacturers are seeking to comply with international standards of good environmental practice. For example, by mid-1997, eight large firms received certificates of compliance with ISO 14000. The signing of the Customs Union with the European Union in 1995 and the SFYDP policy of complying with EU environmental standards will further encourage better practices so as to maintain international competitiveness.

22.22 **Non-governmental organizations (NGOs) and public participation.** A recently prepared "Guide to Non-Governmental Organizations," based on a sample of 1,793 NGOs identified by the Economic and Social History Foundation of Turkey, states that out of a total of 60,000 voluntary organizations, associations and foundations, only 7% are active in environmental issues. Most are in major cities: 39% in Istanbul, 25% in Ankara and 11% in Izmir; 21% have branches, and 14 % have liaison offices.⁸ Most are relatively

⁸ According to the Environmental Foundation of Turkey (EFT), NGOs concerned with air pollution include the Turkish Foundation for the Protection of Monuments and Environments of Touristic Value and the EFT.

new, with 62% established after 1991. Most get revenues from membership fees, but only 27% were classified as working for the "public benefit." Environmental NGOs have been particularly successful in raising and addressing issues about coastal zone management, protection of endangered species, erosion, mining, and nuclear energy. Although numerous, the effect of these organizations in helping to improve the environment has been limited. Problems involve relations with the Government, inter-organizational solidarity, mobilization of and relations with members, management structures and procedures, remedial approaches and solutions, relations with the media, finances, technical equipment, and self-assurance.

2.23 Other problem areas are as follows: Public and private organizations have not been given sufficient authority and responsibility; extensive public environmental awareness have not yet been

Those dealing with water quality include the Society for the Protection of Nature, the Society for Environmental Protection and the Development of Green Areas in Turkey, the Association of Turkish Municipalities (and regional unions of municipalities), the Aegean Society for Environmental Health, and EFT. NGOs focusing on soil and land use include the Turkish Foundation for Reforestation, Erosion Combat and Protection of Natural Assets (TEMA), Turkish Soil Science Society, and the Society for the Protection of Nature and EFT. Those dealing with forests are addressed by the Forestry Society of Turkey, the Green Turkey Forestry Society, the Society of Forest Technicians, the Chamber of Forest Engineers, the Foundation for the Protection of Forestry and Nature, the Society for the Protection of Nature, and the EFT. Solid waste issues are handled by the Environmental Protection and Beautification Society, the Association of Turkish Municipalities, the Society for the Protection of Nature, and the EFT. Pesticides are the concern of the Society for Plant Protection in Turkey, the Society for Technical Beekeeping, the Society for the Protection of Nature, and the EFT.

established; resources are inadequate and inefficiently used; and conflicts, redundancies and loopholes in the legislation persist. A specific problem is that mechanisms to ensure public participation at any level of decision-making have generally not been institutionalized. Although some limited, formal mechanisms exist, such as local environment committees, the EIA process, Councils for the Environment and Forestry, and other areas specified by the Procedures on Administrative Disputes, the absence of public input is especially apparent in the operation of parastatals, as well as in the education, health, culture and forestry sectors, and in local governments.

D. MANAGERIAL INSTRUMENTS

2.24 **Planning.** Plans are a key feature in Turkey's command-and-control style of environmental management. These include:

- **Urban development plans.** -Two types are required for all municipalities: (a) structure plans, which are 1/5,000 scale maps along with detailed reports indicating patterns of land use, types of zones, projected population densities, building densities, growth directions, magnitudes of settlement zones, and transport systems; and (b) implementation plans, which are 1/1,000 scale maps that indicate buildings in various zones, their densities and order, roads, and stages for providing urban services. The plans can be designed by municipalities or assigned to the Bank of Provinces or private firms; they become effective after city councils approve them;
- **Territorial and environmental plans.** Introduced in the 1960s,

territorial plans are expected to guide land use and settlement decisions, especially with regard to housing, industry, agriculture, tourism, and transport. In general, they are developed and approved by the Ministry of Public Works and Settlements (MPWS). More recently, regional environmental plans were introduced, produced by the ME; it is supposed to ensure that natural resources are used in ways that sustain development. Both territorial and environmental plans are 1/25,000 scale; and

- **Other plans.** Various other plans are produced by 22 agencies and organizations under various laws. These include: (a) regional plans (prepared by the SPO or assigned to others); (b) forest management plans (prepared by the General Directorate of Forestry); (c) “Long-term Development” and “Local Development” plans prepared by the General Directorate of National Parks, Game and Wildlife to manage national parks; (d) master plans, to direct sectoral activities such as tourism, transportation and energy; (e) management plans for specially protected areas; and (f) forest village development plans prepared and implemented scale by the General Directorate of Forest-Village Relations.

2.25 Environmental Impact Assessment (EIA). The EIA Regulation, drafted by the ME and enacted in 1993, was based on US and EU procedures. These assessments are required for a wide range of economic activities,

including major infrastructure projects, large housing developments, energy installations, various factories (e.g., cement, fertilizer, sugar, tobacco and rubber), and tanneries. ~~-Also, they are required they are required-~~for activities in areas protected under national legislation or international conventions, as well as for sensitive locales such as agricultural land, wetlands, lakes, and ecosystems rich in biodiversity. ~~-These reports must be prepared during the planning phase for an investment, since the activity can only be approved, authorized or licensed to proceed after an “EIA Positive Certificate” is issued. Public comment on the draft report is obtained through the LEC. The ME is responsible for monitoring the process and issuing permits after all applicants’ requirements are met. Unfortunately, in June 1997, the EIA process was weakened, since the requirement to assess projects planned for sensitive zones was abolished and public participation was limited.~~ Supplemental EIA procedures can also exist such as those used by the İstanbul Water and Sewerage Company for water catchments. An initial environmental evaluation, consisting of a checklist and an evaluation table, is required for a range of less polluting activities.

2.26 The EIA process got off to a slow start after it was approved in 1993, although Table 2.1 suggests that the number of reports received and reviewed has grown steadily. Of the total submitted, 206 EIA reports were approved and only five were rejected; these were for a pier and storage facility in İskenderun, a dam and hydroelectric plant in Antalya province, a stone quarry in İzmir province, a marble quarry in Sakarya province, and a housing development in Aydın province. ~~Unfortunately, in June 1997, the EIA process was weakened, since the requirement to assess projects planned for sensitive zones was abolished and public participation was limited.~~

Table 2.1: Status of EIA Reports
July 2, 1993 - September 15, 1997

Sector	<i>Number of EIA Reports Approved (Rejected)</i>					Total
	1993	1994	1995	1996	1997*	
Infrastructure	0 (0)	3 (0)	15 (1)	5 (0)	15 (1)	38 (2)
Energy	0 (0)	3 (1)	2 (0)	1 (0)	3 (0)	9 (1)
Mining	0 (0)	7 (0)	18 (1)	42 (1)	58 (0)	125 (2)
Industry	1 (0)	6 (0)	20 (0)	31 (0)	59 (0)	117 (0)
Tourism	0 (0)	6 (0)	5 (0)	3 (0)	6 (0)	20 (0)
Total	1 (0)	25 (1)	50 (2)	92 (1)	141 (31)	309 (5)

Source: ME, 1997

2.27 Environmental information. Various governmental organizations,⁹ universities and professional organizations (chambers of industry and commerce, engineers and architects, and physicians), and local governments produce environmental information. However, the scope of the data varies, as does the way it is applied and the techniques adopted to collect and assess the data.

The following information is regularly collected:

- **Air pollution statistics.** The Refik Saydam Hygiene Center, under the Ministry of Health, monitors particulate matter and sulfur dioxide concentrations in many cities. SIS publishes monthly

bulletins on air quality, along with multi-year reports;

- **Water statistics.** The DSI routinely monitors water quality. Monitoring began in 1979 with 65 sampling points, and by 1994, the sampling point had grown to 1,080. SIS is now centralizing this and other data in a geographical information system to assess water quality by basin;
- **Marine data.** The Navy's National Oceanographic Data Center collects and disseminates data related to the marine environment;
- **Forest inventories.** The Ministry of Forestry regularly processes inventories and statistical data on the state of Turkey's forests;
- **Climate statistics.** Meteorological data are collected each day by the General Directorate of Meteorology;

⁹ Such as the DSI, Electricity Surveys Administration, SIS (with its Environmental Statistics Group), Turkish Electricity Generation Company, GDF, GDAR, GDRS, Ministries of Health, Energy and Natural Resources, Forestry, Industry, Agriculture, Education, Culture.

- **Solid waste inventories.** Since 1991, SIS has prepared a municipal solid waste inventory, surveys on household garbage, commercial garbage, and a hospital waste inventory;
- **Industrial waste inventories.** Since 1992, SIS has completed two surveys on manufacturing waste, three on power plant waste, and two on mining waste; and
- **Municipal environment inventory.** Surveys were conducted in 1995 and 1996 by SIS on municipal drinking water, sewerage and solid waste services, and environmental employment and expenditures.

22.28 Currently, the SIS is preparing an inventory of environment-related industries and services, and of environmental employment and expenditures in the public sector. SIS also conducts census on population, manufacturing industries and agriculture. Also, it is preparing a regular reporting system on environmental data for local administrations. Finally, the Turkish Scientific and Technical Research Center (STRIT) is preparing a flora and fauna inventory that will include a data base on an herbarium and seed banks.

22.29 **Research and development (R&D).** According to 1995 figures, annual expenditure on R&D totaled TL 29.5 8.8 trillion (US\$645804 million), or 0.38%44% of GNP.

-Universities carried out 697%, the private sector 243%, and the Government 740% of the R&D work. The portion of this work that had an environmental content is unknown.

22.30 Environment-related R&D is conducted or supported by universities, various scientific and technical institutes and centers, the Technology Development Foundation of Turkey, state ministries, the SPO and SIS, special public organizations such as the Administration for the Development of Small and Medium-Scale Industrial Enterprises, the TIS and the National Productivity Center, parastatals, the private sector, trade unions, and professional and voluntary organizations. The STRIT has produced small inventories of environmental R&D conducted by various organizations and units. However, these need to be updated and their outcomes/practical applications need to be monitored as it is difficult to analyze the use of this research or apply an adequate cost-benefit analysis. It is equally difficult to develop policies and strategies for improving environment-related R&D.

22.31 **Environmental education** is provided in formal pre-schools, primary/middle/high schools, and in special programs. Further, programs related to the environment are offered in at least 212 Turkish universities (TMMOB, 1997), and courses such as ecology, environmental law and policies are offered at the undergraduate and postgraduate levels. In addition, university groups and clubs focus on the environment and nature. Non-formal education programs, which attract about one million people a year, also include some form of environmental education and training. They involve subjects such as nutrition, health, child care, environmental care and

cleanliness, and the impact of the environment on the spread of diseases.¹⁰

22.32 Economic and Financial Instruments. Only a few economic measures have been adopted to manage the environment. Although some taxes exist on goods and services that affect the environment, such as the gasoline consumption tax, marine vessel fees, or electricity and coal consumption taxes. These taxes generally support the operating budgets of governmental organizations and do not alter significantly the ~~behavior~~ ~~behaviour~~ of consumers. However, part of the tax on motor vehicle sales, automobile sales, and airplane tickets is earmarked for environmental purposes. Also, a deposit-refund scheme exists for beverage containers and a buy-back program for vehicle batteries.

22.33 In energy, besides a uniform value-added tax of 15%, customs tariffs and consumption taxes are applied to petroleum products, but the amount varies if the goods are imported. For example, the consumption tax on leaded gasoline is ~~28~~19%, unleaded gasoline is ~~27~~18%, diesel ~~18~~30%, and LPG 40%. However, after taxes, unleaded gasoline is ~~slightly less expensive~~ ~~more expensive~~ than leaded gasoline. Thus, consumers ~~do not~~ have an ~~satisfactory~~ incentive to use the ~~less~~ ~~more~~ polluting ~~unleaded~~ gasoline.

22.34 Local governments also levy some environmental fees. The most important is the so-called environmental cleansing tax that is mainly used for solid waste management.

¹⁰ Others include programs on water purification, wastes, sanitary latrines, fertilizer use, collection and storage of wastes without health hazards, avoidance of diseases, immunizations, family planning, etc. Driver's license and apprenticeship training courses also include instruction on the environment.

Other fees include those collected by metropolitan utilities on wastewater, spring waters, animal check-ups and slaughtering and those charged by the LECs for granting emission permits. Fees collected under the Municipal Revenues Act can also be used for environment-related investments. ~~—~~ Various fines are levied on violators of environmental, forest, public works, traffic, mining, and protection of cultural and natural entities laws.

22.35 For their part, pricing policies for agriculture and energy resources have a substantial impact. In agriculture, US\$930 million of subsidies went to support inputs in 1996, mostly for cotton. Outputs were subsidized through: (a) Government fixed-price purchase of nine commodities and (b) soft loans to agricultural cooperatives to purchase products at guaranteed prices. The problem is that these instruments are conducive to the depletion of soil resources, excessive use of inputs and exploitation of marginal lands. ~~—~~

22.36 In recent years, the private sector has been given incentives to invest in the environment. -In 1994 and 1995, the Council of Ministers approved full exemptions from customs duties for imported R&D materials and equipment, matching grants to cover up to 50% of industrial R & D costs, tax rebates of 10% of the value-added tax for R&D materials and equipment procured domestically, and tax exemptions for capital investments related to the environment. Also, a special discounted tariff that is 17% less than the normal industrial rate was approved for electricity consumption by waste treatment plants.

22.37 Financing mechanisms. In 1995, public sector investment for environmental activities was TL 1165.7 trillion (US\$25.5 billion), and was directed to agriculture, mining, manufacturing, energy,

transportation, tourism, housing, education, health, and other public services and infrastructure projects.¹¹ Disbursements for environment-related activities were equal to 5.3% of GDP in 1994 and 3.4% in 1995¹². Various funding sources exist to finance such environmental activities.¹³ According to the Budget Law, environment-related investments can be financed from 20 funds in the general budget.¹⁴

2.38 The Environmental Pollution Prevention Fund, capitalized in 1991, had revenues of US\$346 million by 1996. These were generated from motor vehicle inspection

fees (20% share), auto sales taxes (25% share), airplane tickets (0.5% of the price), air and sea cargo taxes, and transfers. During the same period, \$184 million was disbursed for 182 projects on reforestation, sewerage and drainage, stream rehabilitation, and geothermal energy development. The Fund also supports research and training, protection of biodiversity and environmental clean-up. Fund revenues are directly transferred to the consolidated budget of GoT and 5 % of collected revenues are reallocated to the Fund for management by ME. The Minister has the authority to approve the disbursements from the Fund.

¹¹ This figure probably overestimates actual environmental expenditures as it includes the full project cost of investments that may be only partially environmental. The SPO is refining this methodology by including only projects for solid waste management, environmental research and development, flue gas desulfurization, stack gas filtration, natural resource management, energy conservation, industrial waste treatment, sanitation, renewable and clean energy, environmental infrastructure, and EIAs. Using this approach, public investment is less than 10% of the above figures.

¹² By comparison, the US public sector spent 6.6% of GDP on environment-related activities in 1990 and Germany spent 8.5% in 1989.

¹³ These include (a) allocations from the general budget, (b) funds created within or outside the budget, (c) taxes collected on polluting goods and services, (d) fines and charges, (e) domestic funds to prevent and manage environmental problems, (f) credit and grants from international organizations, and (h) revenues from existing facilities.

¹⁴ The 20 include funds for environmental pollution prevention, disasters, afforestation, ORKÖY (forest villages), municipalities, earthquakes, special provincial administrations, national parks, special environmental protection, special settlements, reform, support to and development of mass housing, upgrading of traffic services, development of tourism, local administrations, support to and improvement of health services, credit for new settlements, housing for people in backward areas, relief to farmers suffering natural disasters.

2.39 Municipal revenues, especially of metropolitan governments, are obtained from diverse sources. In addition to receiving 25% of total collected State revenue, municipalities accrue revenues from local taxes and fees that cities have collected since 1985. Sources are: (a) taxes on property and land, well water, electricity and coal gas consumption; and (b) fees from businesses that remain open on holidays, animal check-ups and slaughtering, inspections for measuring and weighing devices, and construction. Water consumption and wastewater fees are often used for solid waste management, water treatment and supply, sewerage and sewage treatment, parks and recreation, and noise control. On average, 40% of a municipality's budget is spent on "cleansing" activities which is primarily solid waste collection and disposal.

2.40 The Bank of Provinces (İller Bank), a public entity, gives grants and credit to municipalities, makes advance payments, serves as a loan guarantor, and helps fund technical assistance and implementation plans. Its loans finance waste management as well as environmental infrastructure such as water treatment facilities, drinking water supplies and waste water treatment plants. In 1996, the Bank of Provinces provided about

US\$610 million to local governments through short- and long-term loans of which \$170.4 million was for water supply projects and \$43.3 million was for sewerage and wastewater treatment facilities (Iller Bank, 1997). In the “Structural Adjustment Project for Local Governments,” reforms are proposed to restructure Iller Bank so it becomes more of an investment bank.

22.41 Aside from Iller Bank, municipalities can borrow with central government guarantees from external sources for their larger projects. At the central level, Turkey can secure resources from international and national organizations and institutions,¹⁵ and can borrow from international capital markets. In 1996, the municipalities’ share in total fixed capital investments was an estimated 18% (at 1994 prices). In the 1996 investment program, 22% of public investments in environment-related projects were to be made by local governments. Eighty percent of their finances come from Government transfers, which represent their share of centrally-collected taxes, along with direct subsidies.

E. Constraints on Effective Management and Their Consequences

22.42 **Legislative Constraints.** Unfortunately, the Environment Act is constrained in various ways: (a) while the objectives of the Act are laudable, its implementation is difficult; (b) the HCE and the LECs have no real executive authority; (c) neither the environmental subsectors to be covered nor the responsible agencies (and

¹⁵ These include the World Bank, United Nations, European Community (i.e. European Social Fund, European Regional Development Fund, Agricultural Orientation and Guarantee Fund), European Investment Bank (EIB), the METAP Fund (supported by UNDP, EU, EIB, and the World Bank), Islamic Development Bank, and Kuwait Development Fund.

their tasks) are —well defined; (d) development is given priority over preserving the environment; (e) Environmentally harmful activities are classified as “administrative violations” that may only be punished with administrative sanctions; (f) violations of different magnitude are fined at the same rate; (g) the Act on National Parks allows construction, mineral/petroleum exploration and extraction in areas reserved as national and natural parks; (h) the Act on the Protection of Natural and Cultural Assets asserts the need to preserve assets, but then defines ownership and responsibility in conflicting ways; and (i) legal arrangements to identify, register and preserve assets and impose sanctions are inconsistent. —At present, efforts are being made to modify the Act and correct these shortcomings (see Annex 3).

22.43 Despite the array of measures, enforcement efforts are weak. For example, illegal settlements were encouraged and regularized in the 1980s through several *gecekondu amnesties*. —Second, agencies such as the ME, which is charged with carrying out certain functions, is not authorized to impose regulations on other public agencies. This is particularly problematic with respect to wastewater discharges, solid waste disposal and EIAs. Indeed, the Seventh Plan acknowledges “conflicts of authority, duty and responsibility among organizations related to the environment.”

22.44 Moreover, a 1995 —survey of public officials found that 75% lack adequate information on EIAs; only 5% can translate legal arrangements on environmental protection into practice; 35% have no notion of whether laws are sufficient; 21% feel the laws do not clearly identify implementing agencies; 73% say their colleagues have no idea about the Environment Act; and 94% have not accessed the Act’s regulations (Önen, 1995).

22.45 Institutional Constraints. Contrasts between the functions of the ME and lack of necessary equipment for properly performing its duties have led to various deficiencies. In particular, as its structure allows activity only through political power, the ME can not function as effectively as it should. Similarly, the Councils for Preservation of ~~en~~ Fixed-Natural and Cultural Entities are also hampered: (a) the ME, local governments and professional and voluntary organizations have no representation on the Central Committee and regional committees (b) international documents are rarely invoked to identify special areas; (c) property rights, financing, the use of economic instruments, and private sector involvement are all problematic issues; and (d) the division of authority among the Ministries of Environment, Culture and Forestry is ambiguous.

2.46 Local authorities have limited human resources to undertake their responsibilities. Only 10% of all public employees work at the local level as compared to 31% in Germany, 60% in the U.S. and 65% in Japan. This situation is further weakened as political patronage often plays a role in the selection, appointment and promotion of municipal staff (TUSIAD, 1996). Finally, local governments are not autonomous in their ability to set salaries for qualified personnel, create or eliminate positions as needed. Also, for solid waste management, the two most common approaches adopted in other countries (contracting collection services and concession contracts for developing and operating waste disposal facilities) are difficult to implement.

22.47 NGOs face constraints that affect their ability to participate. A 1996 survey found poor relations with Government, which only allows them (especially professional organizations) limited participation in official bodies, decision-making and implementation processes. They also encounter problems

with the mass media, and with other organizations (Uğur, 1996). In addition, they have difficulties mobilizing membership, developing proposals, financing activities and technical equipment.

22.48 Participation Constraints. Units within the ME seek public participation in environmental decision-making, but they are limited by administrative procedures. For example, representatives of voluntary organizations must be invited by the Minister to the ENC and together can number no more than 25. Also, the ENC is defined as a *consultative organ* and its decisions are only effective when they are approved by the Minister. Further, the composition of the ENC, HCE, and the LECs is incomplete as it has only a limited number of engineers, architects, planners, health personnel, workers producing goods and services, artisans and craftsmen. Another shortcoming is the overriding power of Government representatives, especially in the LECs. Various legislative arrangements that were introduced to ensure the right to participate actually limit the participation of scientists, teachers, government employees, and students. Transparency is also a problem, and citizens are often unaware of how decisions are made or how they can participate in the process. Moreover, Government information about environmental conditions, policies, programs, and projects is not readily available.

22.49 Managerial Instruments Constraints. Although numerous **plans** are developed, their usefulness is limited. For example, urban development plans do not keep pace with rapid population growth and changes in settlement patterns, and are therefore irrelevant. —The plans are also confined to physical dimensions, not integrated with projections and targets of other plans, and are frequently changed. Environmental plans are created by the

MPWS, addressing local issues, and not necessarily complying with environmental issues that are of concern to the ME. –This leads to conflicts. Moreover, a conflict of authority and responsibility exists with respect to devising plans and implementing them. The documents often lack data and inappropriate planning techniques. According to the Seventh Plan, the results are “irrational decisions in the development and distribution of national resources and failure in directing local investments to proper sectors and site selections.”

2.50 Management/regulatory capacities as well as monitoring/evaluation capabilities of the ME and LECs are not sufficient for effective environmental management at the local level which is relatively more important. For effective environmental management. Therefore, there is a need to strengthen provincial level capacity to support development of environmental protection and management activities operated by municipalities. This could include urban pollution abatement strategies and local environmental action plans, monitoring and evaluation of environmental conditions, permitting and enforcement, and development of financing mechanisms for environmental management. The latter is especially important as municipal revenue-raising capacity is currently weak

2.501 Equally problematic, the EIAs lack various critical inputs, such as a reliable database, baseline and inventory studies on environmental conditions, sufficient budgets and qualified professionals in the public sector to prepare them properly, and mandatory monitoring and auditing mitigation measures. Also, some public agencies do not want to apply EIA procedures for public investments. In addition, they are hampered by lengthy periods for assessment, lack of monitoring to evaluate and enforce compliance with

mitigating measures, insufficient public participation, and conflicting authority and responsibility among units that make public investment decisions.

2.512 There are limited inventories carried out by STRIT about environmental research and development conducted by the multitude of R & D organizations and units. However, these inventories need to be updated and practical applications as well as their outcomes need to be monitored. This situation precludes analysis on the utility of such research and a proper cost-benefit analysis. Thus, it is difficult under these conditions to develop policies and strategies for improving environment-related R&D, they are hampered by lengthy implementation periods, conflicting authority and responsibility among units that make investment decisions, and insufficient public participation during EIA studies.

2.523 Although numerous **environmental education** and training programs and courses exist, the problem is that the techniques and equipment used and the information disseminated are often outdated, unsuited for the target population, and of poor quality. These deficiencies are striking, especially with respect to explanations about the cause of environmental problems. Thus, desired returns from education have not been obtained nor has public behavior been altered.

2.534 The array of **economic instruments** used successfully in other countries are applied in Turkey in a very limited way. These include user charges based on the long-run social cost of providing services, development taxes linked to environmental improvements, charges on polluting products, performance bonds, effluent charges imposed within a watershed or airshed, and differentiated taxes to discourage the use of polluting fuels (OECD, 1992). However,

these measures (both incentives and fines) have lost their effectiveness over time due to inflation. The environmental cleansing tax has been increased at just half the inflation rate, so in real terms there is a decline in revenues.

22.545 Despite the broad spectrum of **financing sources**, environmental management, particularly at the local level, is seriously hampered. Local governments' share of the general budget and tax revenues is only 3.22+4% of GNP, or 12% of all public spending. —They are continually strapped because of the inadequacy of their funding and the existence of but few schemes to coordinate municipal and Government efforts.

22.556 The shortage of finances is exacerbated by tax evasion, limited enforcement powers, low property tax rates, and the low limit on private cost-sharing for infrastructure investments (currently 2% of property value). As noted in the Seventh Plan, municipalities cannot collect a

substantial part of their tax and non-tax revenues from residents due to the political nature of increasing tariffs. Thus, the problem is more the inability to set rates and collect revenues, than taxpayer unwillingness to pay. As a result, municipalities have a difficult time increasing investments for environmental protection and management.

22.567 In many respects, the situation in villages is worse. In 1992, revenue per village was only about TL 15.2 million (SPO, 1995/a) and a 1924 Village Law does not permit activities that could solve environmental problems. Thus, according to 1993 data, the percent of villages with adequate drinking water varied from 46%-95%, while the national average was 54% (SPO, 1995/b).

2.578 The above constraints have important consequences for Turkey's ability to manage and solve its environmental problems (summarized in Table 2.2). Many of these outcomes are interrelated. For example, the low level of participation in environmental decision-making means that laws, regulations and plans are often developed without stakeholder input, which, in turn, produces inappropriate decisions and public ignorance about their substance.

Table 2.2: Consequences of Managerial Constraints

<u>Constraint</u>	<u>Example</u>	<u>Major Consequence</u>
<u>Over-reliance on regulatory approach</u>	<u>Env. management by plans, fixed regulations and EIA</u>	<u>Environmental management is more costly, less efficient and less effective than a balanced mix of economic & regulatory instruments</u>
<u>No integration of environmental variables in planning tools</u>	<u>Local development plans do not directly address environment</u>	<u>The most prevalent management instrument that affects the environment cannot directly deal with priority environmental problems</u>
<u>Limited avenues for public participation</u>	<u>Many NGOs but little involvement in decision-making</u>	<u>Without real stakeholder participation, the planning, implementation & evaluation of policies & projects is less effective and more costly</u>
<u>Inadequate public resources to implement environmental laws</u>	<u>Compliance with EIA decisions is not monitored</u>	<u>Insufficient staff, budgets, information, & equipment mean that public authorities cannot achieve environmental policies & objectives</u>
<u>Relevant information is not available, analyzed or applied</u>	<u>Many environmental statistics but seem not to affect decisions</u>	<u>Unclear link between environmental data, analysis & decision-making results in resources wasted on data collection & uninformed decisions</u>
<u>Budgets, authority and information are overly centralized</u>	<u>A relatively low 22% of all environment-related investments are made by local authorities</u>	<u>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</u>
<u>Extensive legislation but low levels of awareness</u>	<u>Waste & EIA rules are largely unknown by relevant officials</u>	<u>Environmental objectives & policies cannot be achieved when those responsible for implementation are unaware of key regulations</u>
<u>Extensive education system but inadequate educational content</u>	<u>11.5 million students potentially receive inappropriate info. on the environment</u>	<u>Returns to education are not achieved & positive environmental behavior is not encouraged when the messages being passed to the young are outdated, incorrect or irrelevant to their conditions</u>

3. An ENVIRONMENTAL PROFILE OF turkey

This chapter reviews Turkey's environmental problems with respect to urban areas, natural resources, marine and coastal resources, cultural and natural heritage, and environmental hazards. Also, preliminary priority geographic areas are identified where critical environmental problems converge.

A. THE URBAN ENVIRONMENT

3.1 As mentioned earlier, Turkey is rapidly urbanizing, with growth rates of 4.4%, or nearly triple the rate at which the national population is growing. The percentage of citizens living in cities is expected to increase from 54% in 1990 to 70% in 2000. This presents concentrated problems that are usually greater in informal settlements, where the supply of infrastructure and services cannot keep pace with demand. Options for managing population growth and migration are listed in Annex A6.2.

Air Quality

3.2 Information on air quality is limited, because only particulate matter and SO₂ are measured regularly. In that context, the limited data indicates that except for some

industrial areas and secondary cities, air pollution is not a serious problem, even in big cities. In virtually every case (except for particulate matter in İzmir), both these air pollutants have been reduced since 1990, often quite significantly (see Table 3.1). Specifically Ankara has experienced this difference as a result of natural gas instead of low quality coal for domestic heating. Only Diyarbakır continued to exceed the long-term standard (LTS)¹⁶ for particulates, while only Diyarbakır and Konya exceeded the LTS¹⁷ for SO₂. Diyarbakır, Erzurum, Sivas, Muş, and Bingöl had the most days exceeding the short-term standard (STS)¹⁸ for particulates, while Erzurum, Kütahya, Eskişehir, Diyarbakır, and Sivas had the most days exceeding the STS¹⁹ for SO₂ between 1990 and 1995 (EFT, 1995) implying that air pollution is an emerging problem in medium size cities.

¹⁶ 150 µg/m³

¹⁷ 150 µg/m³

¹⁸ 300 µg/m³

¹⁹ 400 µg/m³

Table 3.1: Comparative Air Pollution Trends (Cities with heaviest air pollution)

City	Particulate Matter (ave. $\mu\text{g}/\text{m}^3$)			Sulfur Dioxide (ave. $\mu\text{g}/\text{m}^3$)		
	1990/91	1995/96	% Change	1990/91	1995/96	% Change
Ankara	107	84	- 21	218	78	- 64
Antalya	136	75	- 45	79	55	- 30
Bursa	139	48	- 65	329	44	- 87
Diyarbakır	201	151	- 25	285	151	- 47
Erzurum	141	99	- 30	262	140	- 47
İstanbul	151	97	- 36	315	135	- 57
İzmir	82	102	+ 24	112	104	- 7
Konya	154	71	- 54	415	189	- 54
Samsun	89	33	- 63	187	93	- 50
Sivas	250	86	- 66	402	130	- 68

Source: Ministry of Health, 1996

3.3 Energy is used inefficiently both in households and industry. For example, average household energy demand in Turkey is 195 kWh/m², while in industrialized countries, it dropped below 100 kWh/m² and efforts are underway to bring it down to 50 kWh/m². Also, studies show the industrial sector could save at least 2.7-4.8 million TOE a year, which would reduce air pollutants: Energy consumed by the transportation sector in Turkey is relatively high. For example, while automobiles in Turkey consume, on average, 11.7 liters of fuel per 100 kilometers, this value is 8.6 in Canada, 7.5 in Italy, 8.4 in Germany and 7.6 in Great Britain according to 1985 data. Turkey emits 8.8 kg. of SO_x 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 half when compared

with energy consumption in high-income countries (World Bank, 1997b). Moreover, power plants routinely exceed the SO₂ emission standard²⁰. According to 1994 measurements, real values ranged from 3,178-6,475 for Yatağan, 4,350-9,450 for Afşin-Elbistan, 2,030-4,823 for Seyitömer, 812-5,233 for Soma, 5,769-8,948 for Orhaneli, 582-1,160 for Çatalağzı, and 9,884-11,693 for Kangal power stations (Kadioğlu, 1996). The environmental effects of exceeding the standards has not been studied.

3.4 At the national level, data are available. National-level trends are based on projections for particulates, SO₂, NO_x, and CO₂ emissions from energy sources. Annual particulate emissions caused by energy production and consumption were expected to grow estimated from around 960,000 tons

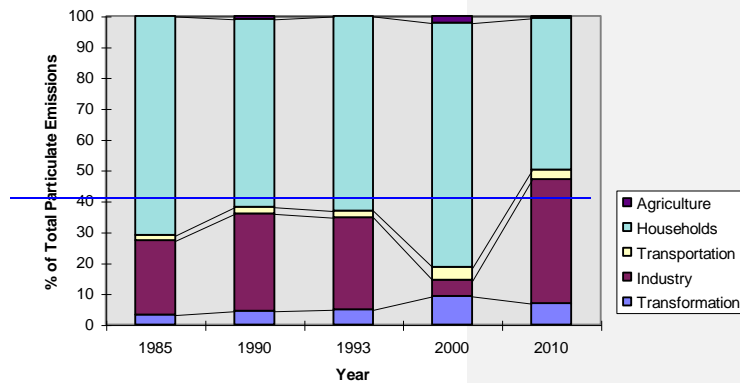
²⁰ 1,000 $\mu\text{g}/\text{m}^3$ for plants with a thermal power of 300 Mw or more according to the Turkish Air Quality Regulation.

in 1985 to 1.5 million tons. The estimate for the year 2010 is 1.9 million tons in 2010 with the industrial sector replacing households as the major source. Fuelwood, dung and crop residues are the most important household sources of particulate matter.

Turkey's three principal energy sources – petroleum, lignite and fuelwood – are those most responsible for ambient and indoor air pollution. In 1996, the shares of these sources in the national energy balance were as follows: petroleum 47%, lignite 18% and fuelwood 8% (MENR, 1997).

3.5 SO₂ emissions mainly stem from combustion of very low quality lignite by industries, energy transformation and households using outdated and polluting technologies. In Turkey annual such emissions are expected to skyrocket from amount to 1.5 million tons in 1985 to 3.5 million tons in 2010. The relative weight of the transformation sector in total SO₂ emissions is evident in Table 2.2. The next most significant SO₂ emissions are from households and are mainly due to the use of lignite. In fact, 84% of household SO₂ emissions are from lignite and this share will further rise to an estimated 90% by 2010. Turkey emits 29.0 kg. of SO_x per person annually while the OECD average is 51.2 kg. However, it emits 8.8 kg. of SO_x to produce US\$1000 of GDP each year while the OECD average is only 2.9 kg. for the same economic output, indicating inefficient or polluting production processes (OECD, 1994).

Table 2.1: Sources and Evolution of Particulate Emissions in Turkey (%)



Source: WG/6, NEAP

3.6

Table 2.2: Sources of SO₂ Emissions in Turkey (%)

Source: WG/6, NEAP, Ankara 1996.

In Turkey, NO_x emissions were around 357,000 tons in 1985; they are expected to jump from 357,000 tons in 1985 to 1.2 million tons by 2010, primarily from NO_x emissions by sector are given in Table 2.3. The principal source of this air pollutant is the use of lignite; while the share of households contributing is diminishing, pollution from the transport sector is growing.

BOX 3.1: COSTS OF URBAN AIR POLLUTION

An average of 15 million residents of Turkey's major cities were exposed to particulates and SO₂ levels above WHO standards from 1990- 1996. If annual levels could achieve WHO standards, an estimated 3,310 lives could have been saved in 1993 and there would have been approximately 5,940 fewer hospital admissions for respiratory ailments, 112,100 fewer emergency room visits, 6.85 million fewer restricted activity days, and 73,000 fewer cases of respiratory problems for children in the 0-12 age group per year. These health problems represented total health costs equal to 0.12% of GDP in 1990 and 0.08% in 1993 (Zaim, 1997).

Hypothetical air pollution abatement costs were also estimated. If manufacturing enterprises were required to reduce their 1993 particulate emissions, SO₂, NO_x, and CO, to 1990 levels, it would entail expenditures of 1.93 trillion TL (constant rate for 1990), equal to 0.45% of GDP. These figures do not include a complete cost-benefit analysis of urban air pollution control because: (a) the benefits have been calculated for only two pollutants and cover only health effects; (b) the abatement investments are for a larger number of air pollutants; (c) the reduction in industrial emissions will not guarantee that WHO levels of air quality will be met; and (d) industrial emissions are not the only source.

3.7 In the transport sector, the number of vehicles almost doubled to over four million (about three million cars and the remainder buses and cargo vehicles) from 1990-1995. The car fleet is primarily located in big cities, with the largest number in İstanbul. Against this, use of unleaded gasoline increased slightly from 2% of all petroleum fuels in the early 1990s to 3% in 1994. Domestic production of unleaded gasoline is expected to increase from 226,000 tons in 1996 (7.5% of national petroleum production) to 372,000 tons in 1997 (10.9% of national petroleum production). This trend should accelerate, with the introduction of new cars that consume only unleaded gas. In addition, the gradual replacement of the vehicle stock with cleaner and more efficient vehicles probably contributed as well to better air quality.

3.8 On the positive side, city-specific data indicate that ambient air pollution from particulates and SO₂ has significantly declined during the first half of this decade, due to two major decisions concerning the fuel mix. First, low quality, high-sulfur domestic coal was prohibited for heating and was replaced by higher quality

BOX 3.2: LEAD - THE UNKNOWN THREAT

In 1994, use of unleaded gasoline in transport remained at only 3% of vehicle fuel consumption, leading to lead emissions of at least 1,100 tons. The lead level of those residing in Ankara for over 10 years averaged 16.5 µg/dl compared to 9.1- 10.6 µg/dl for those living at the perimeter (Güvendik et al, 1994).

Countries using leaded gas have experienced serious health problems. According to USAID, in Cairo, lead has caused additional heart attacks, strokes, premature death, and the loss of an estimated 3.75 IQ points per child (USAID, 1995). In Bangkok, before the widespread use of unleaded fuel, lead was associated with up to 400 additional deaths a year, 800 extra heart attacks and strokes, the loss of 3-5 IQ points per child under 8, and several hundred thousand cases of hypertension (USAID, 1990). In these and other countries, the people most affected are those directly exposed to vehicular emissions: traffic police, street vendors, street children, and children in schools located near heavily-traveled roads.

imported coal. Second, major investments were made in supply pipelines, household distribution networks to substitute natural gas for coal in several cities. Since 1988, gas consumption increased almost six times

from 1.1 million TOE to 6.2 million TOE, accounting for almost 10% of total energy consumed in 1995.

~~3.9 **Issues.** According to data by the General Directorate of TTK (Turkish Coal Enterprise), lignite extraction is steadily rising. Beginning with a yearly average of five million tons in the 1960s, it grew to 6.6 million tons in 1980, jumping to 50 million tons in the early 1990s, and finally to 53 million tons in 1995. It is estimated that in 2010 lignite production will reach 184 million tons (an increase of 350%). Demand will also rise: coal demand will reach 30 million tons with a 12% average annual increase while the demand for lignite will follow the same course (ALTAS, 1996). Methane, carbon monoxide and coal dust from mining, processing and transporting coal and lignite lead to air, water and soil pollution, cause related health effects and damage the vegetative cover.~~

~~In the early 1990s, 12.2 million tons of wood were consumed annually as energy. This figure may rise to 19.5 million tons in 2000, and to 19.7 million tons in 2010. Fuelwood combustion produces both greenhouse gases and is responsible for many indoor air pollutants when used as a domestic cooking and heating fuel.~~

~~From a base of 18,000 tons in the 1950s, petroleum production reached 4.5 million tons in 1991 but later fell to 3.5 million tons in 1995. However, while petroleum demand was about 500,000 tons annually in the 1950s, it reached 27.9 million tons in 1995 with an average annual increase of 9%. Demand is estimated to rise to 29.9 million tons in 2000, and 39.8 million tons in 2010. Petroleum exploration, extraction, processing, and combustion in vehicles and industry generate the full range of air pollutants.~~

The main air quality issues are:

- The ban on household use of high sulfur coal is poorly enforced, generally for political reasons. Poor households are unable to pay for converting from coal to natural gas;
- 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;
- The relatively low efficiency of energy use by industries, transport and households results in higher consumption of energy resources and higher levels of pollution;
- Limits for SO₂ emissions at power plants are routinely exceeded because of inadequate enforcement of air and utility regulations;
- The heavy reliance on polluting fuels, especially lignite, creates greater environmental problems, especially when the fuels are used inefficiently. 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; and
- 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 9 for İstanbul); also, the points change from year to year, not allowing comparisons over time. Critical information

gaps exist about [lead and indoor air pollution levels, health effects and economic costs](#).

3.10 **Options.** See Annex 6, Tables 6.3 & 6.4 for the full list. Those with the highest priority include:

- [Encourage wider use of natural gas and high quality coal; develop financing mechanisms for poor households to pay for coal to gas conversion.](#)
- Accelerate the program to promote wider use of lead-free gasoline (through fuel pricing, domestic production of suitable vehicles, import controls, public awareness);
- Improve traffic management in major cities;
- Improve public transport;
- Increase use of clean and renewable energy sources;
- Introduce widespread energy efficiency programs for industrial, residential and service sector consumers;
- Encourage and enforce pollution control and environmental management measures for energy producers, especially power plants and the mining sector; and
- Adopt least-cost energy planning, integrating environmental costs and benefits, to determine the nature and scope of new energy investments.

Water Supply and Wastewater²¹

3.11 [Water consumption was 34 billion m³ in 1996 \(17% of total freshwater resources\), 28 billion m³ of which was supplied from surface waters and the remainder from groundwater. 76% of that volume was used for irrigation followed by drinking water \(14%\) and industrial uses \(10%\).](#) This corresponds to an [annual consumption](#) of drinking water of [about 74 m³ per capita](#), compared to about 100 m³ in Europe. [The overall status of water supply in Turkey is good.](#) [However, access to piped water can be a problem for a particular segment of the population. Nearly 100% of urban dwellers but only 85% of rural residents have access to safe drinking water.](#) Moreover, [water supply is also a problem for new residents in peripheral and/or illegally settled areas of Turkey's cities.](#)

3.12 [Water demand is expected to increase due to agricultural uses.](#) The [State Hydraulic Works \(DSI\)](#) estimates [that](#) the amount of water needed [in 2010 will be 55 billion m³--](#) 78% for irrigation (up from 76% in 1996), 13% for urban (down from 14%), and 9% for [industry.](#) [For example, 4.5 million ha. of agricultural land are currently irrigated, which is 16% of all agricultural land and 17% of all potentially irrigable land](#) (Tekinel, 1995). It is possible to irrigate [25.9~~23.9~~ million ha. of agricultural land](#) although only [8.5 million ha.](#) of which will be economically viable. [Since new investments are being made for irrigation, drinking water, industry, and energy,](#) incentives should be adopted to discourage irrigation in non-economical land.

3.13 Only 6% of the population is served by sewage treatment compared to an OECD average of 63%. [In 1992, industry and manufacturing discharged 843,334,071 m³ of](#)

²¹ Water Resources and Quality are dealt with under Natural Resource Management

wastewater and 70,350,019 m³ of sewage; 69% of the wastewater was not treated, 18% received some treatment and 13% received some pre-treatment. With regard to sewage, 58% was discharged with no treatment. Table 3.24 gives the pollution load for selected wastes (BOD, COD, heavy metals) for all public and private enterprises that did not have treatment facilities. Public enterprises produced a sizable amount of the wastewater pollution load.²² Parastatals generated 57% of BOD, 51% of COD and 42% of heavy metal pollution; 74% of industrial wastewater from state enterprises was discharged without any treatment (compared to 46% for the private sector). Another problem is that wastewater treatment facilities are inefficiently managed.

²² These figures should be considered lower bounds as they are based on a survey of 1,870 enterprises with 25 or more workers that represent 88% of total production and 76% of industrial sector employment.

Table 3.2: Industrial Wastewater Pollution Load, 1992

<i>Pollutant</i>	<i>Public Enterprise</i>	<i>Private Sector</i>	<i>Total</i>
<i>BOD (t/year)*</i>	60,112	45,959	106,071
<i>COD (t/year)*</i>	96,075	93,884	189,959
<i>Heavy Metals ** (kg/year)</i>	89,497	123,415	212,912
<i>Total untreated wastewater * ('000 m³/year)</i>	532,377	90,142	622,519

* originates from industrial processes and sewage

** copper, lead, cadmium, zinc, and chromium

Source: SIS, 1996a

3.14 With 1992 as the base (100), the average index of industrial production was 80.7 in 1987 but reached 114.3 in 1995. Growth was most rapid in the chemical, petroleum, coal, and rubber industries (119.3), followed by paper and printing (116.7), and food/beverages/tobacco (113.1). Industries are allowed to discharge wastewater into the local sewerage system, although the Water Pollution Control Regulation contains some restrictions. For example, industries that produce hazardous wastewater are required to pre-treat their effluents before discharging them. However, treatment facilities are limited. Fewer than 20% of enterprises employing 25 or more workers have treatment facilities. Where they exist, many do not operate properly, if at all.

BOX 3.3: WASTEWATER AND SMALL INDUSTRIES

Small industries pose a special wastewater pollution problem since environmental policies (e.g. incentives to modernize technology) and services such as waste treatment and environmental education has been so far limited. Only 34.6% of all industrial enterprises are located in small industrial sites, and only 1.4% are in organized industrial estates. However, Turkey has 190,000 small enterprises (up to 24 employees) that employ 43% of the industrial workforce.

These enterprises are concentrated in sub-sectors that include highly polluting activities such as textiles/clothing/leather (53% of all firms in the sub-sector) and metal products/machinery/equipment (47%). They are also in food/beverages/tobacco (33%) and forest products/furniture (28%).

3.15 **Issues.** The main water supply and wastewater issues are:

- Public sector distribution networks withdrew 2.96 billion m³ of water in 1992, but only 1.51 billion m³ were recorded as consumed, producing a water loss rate of 49%. This suggests substantial physical and administrative losses in the water supply networks.

- Access to drinking water is limited for village residents and urban slum dwellers;
- Rapid urban population growth and industrialization have strained liquid waste management systems, and utilities have been unable to keep pace with growing demand, especially in the periphery. Because municipalities are constrained by low sewerage charges, lack of investment capital and inadequate staff, very low levels of domestic wastewater are treated;

- The bulk of untreated or partially treated sewage is discharged into surface water; seepage from sewage systems and open solid waste dumps that contaminate groundwater are the main causes of degraded water quality; and
- Industrial pollution is inadequately controlled, only low levels of industrial wastewater are treated, and discharges from small enterprises are poorly managed because of limited treatment facilities and improper operation.

3.16 **Options.** See Table A6.5 in Annex 6 for the full list. Those with the highest priority include:

- Introduce measures to reduce water loss within distribution systems and lower industrial as well as domestic water use, e.g. financial management/cost recovery;
- Increase the supply of potable water in low-income urban neighborhoods and villages;
- Expand the quantity and quality of wastewater treatment facilities, and encourage more private sector involvement/ corporatization of water and wastewater utilities, in provision and management; and
- Enforce industrial wastewater treatment standards and measures, especially in state enterprises.

Solid and Hazardous Waste Management

3.17 In 1991, 22.3 million tons of municipal solid waste was generated, or 590 kg. per capita. ~~In 1991, 22.3 million tons of municipal solid waste was generated, or 392 kg. per capita,~~ which is slightly higher ~~considerably lower~~ than the 1993 OECD average of 500 kg. per capita. In the major cities, winter waste is composed of 45%-50% food wastes, 5%-10% recyclables and 40%-50% ash, slag and other non-recyclable waste. In summer, it is 80%-85% food wastes, 15%-18% recyclables and 1%-3% non-recyclables.

3.18 Waste collection services reach most households in cities and towns. In 1991, 81% of municipal solid waste was disposed in open dumps, 15% in seas, lakes and rivers, 2% was composted, 1% was placed in sanitary landfills, and 2% was burned in the open, buried or dumped in agricultural land. In 1992, household recycled 27% of paper and cardboard waste and 40% of glass. This increased to 36% for paper and cardboard in 1995 but fell to 24% for glass. Besides paper and glass, metal and plastics are the major recyclables. Open dumps experience problems with leachate that contaminate surface and groundwater, and create odors, fires, and methane gas explosions. Dumping into seas, lakes and rivers pollutes these bodies, while open burning contributes to air pollution.

3.19 In 1992, 25.0 million tons of industrial solid waste was produced, or 116 kg. per \$1,000 of GDP. Of this, 47% was sold, 36% was disposed of, 15% was recycled or reused, and 2% was unaccounted. Power plants generated another 12.3 million tons of solid waste, or 3,861 tons per Mtoe. Outside of cities, mining and rural power plants were important sources of industrial waste.

3.20 Recycling rates in the non-household sectors are relatively low. Twenty-two percent of firms in the service and

commercial sectors have limited recycling, as do 21% of industries, 25% of hotels, and 18% of restaurants. Of those commercial establishments that recycled in 1992, 75% dealt with newspapers and magazines, 46% with packing paper, 14% with metals, and 9% with paper and glass. Just over half the firms used some of the collected materials in their own establishments, 43% sold or gave them away, 18% burned the materials, and 6% gave some recyclables to garbage collectors.

3.21 An estimated 300,000 tons of hazardous waste or 1.6 kg. per \$1,000 of GDP are produced annually--nearly 10 times less than the OECD average of 15.8 kg. generated per \$1,000 of GDP. The operation of hazardous waste treatment facilities and the disposal of hazardous waste is the responsibility of metropolitan governments. However, only one hazardous waste landfill operates (the Harmandalı landfill in İzmir) and one hazardous waste incineration plant is nearing completion in İzmit. Public hospitals generate 1.92 kg./bed/day of medical waste while private hospitals generate 2.014.34 kg./bed/day. Although a Medical Waste Control Regulation obliges producers to manage their clinical waste; implementation is limited, since only a few hospitals have their own incinerators. The Harmandalı landfill has a separate section for medical wastes, but it does not meet regulatory requirements. The İstanbul metropolitan government has built an incineration facility for medical waste.

3.22 **Issues.** The main waste management issues are:

- Although a solid waste control regulation emphasizing recycling and safe disposal was introduced in 1991, a 1995 survey of nearly 2,000 municipalities indicated that enforcement of the law was low (SIS, 1994²). More than

half cited economic constraints and a third cited inadequate staff, vehicles or technical skills. One third were not even aware the regulation existed;

- The level of awareness about industrial and domestic waste treatment and disposal facilities is low, as is also true of programs and policies to reduce, reuse and/or recycle solid wastes;
- The record of state enterprises is poor. They sent 54% of industrial solid waste for disposal, rather than recycling, reusing or selling it, compared to 21% of private firms. As with wastewater treatment programs, they can avoid regulations because one government agency cannot enforce its policies and rules on another;
- Local capacity with respect to financial resources, equipment, staff, is low. Rapid urban population growth has strained the systems for solid waste management and municipalities have been unable to keep up with growing demand in the rapidly expanding peripheries;
- Investment levels are low. Some major cities are only now building or operating their first sanitary landfills (e.g. Ankara, Bursa, Gaziantep, İstanbul, İzmir, İzmit, Mersin). Wastewater treatment plants handle only 6% of domestic and less than a third of industrial effluents, and few facilities exist to handle hazardous wastes; and

- Solutions chosen to date tend to be costly. For example, an [integrated waste treatment project](#) (the first of its kind) is nearly completed for [the highly polluted area of Izmit](#). It includes [a sanitary landfill for municipal and industrial solid waste, an incinerator for hospital and hazardous waste, a wastewater treatment plant, a sewage interceptor, and river rehabilitation](#)--costing 464 million DM (US\$273 million). [Less advantaged areas will need to find more appropriate technologies.](#)

See Box 3.4 for a more detailed range of solid waste issues identified in the METAP Solid Waste Management Study.

3.23 **Options.** See Annex 6, Table A6.6 for the full list. Those with the highest priority include:

- Strengthen municipal institutions (to generate revenue, coordinate efforts, measure performance, etc.);
- Regionalize hazardous and clinical waste control/disposal and private sector involvement;
- Develop technology for recycling, resource recovery and waste minimization; and
- Create a national institutional structure to support the local, regional management and technology development options.

BOX 3.4: SHORTFALLS IN SOLID WASTE MANAGEMENT

Cost-Effectiveness of Services

- Few vehicles provided for SWM
- Excess staff for SWM collection services

Inadequate Standards

- Open dumping practices prevail
- Poor or non-existent site management
- Limited control of leachate or landfill gas
- High risk of catastrophic disasters

Support Infrastructure & Management Information

- Few fully functioning vehicle repair garages
- Limited use of transfer stations
- Little investment in upgrading collection vehicles
- Few records of waste quantities & characteristics
- Limited supervision of SWM operators

Private Sector Involvement

- No performance contracts developed
- Obligatory selection of lowest tender
- Constraints on contract periods

Formal Sector Involvement in Reducing Waste

- Over-ambitious quotas not being met
- Low public participation in source segregation
- Limited success with waste reduction technology

Source: METAP et al., 1995

Noise Pollution

3.24 This type of pollution is primarily an urban problem. Road traffic is the main source, followed by construction, industries, air and rail traffic. [Studies suggest that noise pollution is a problem in specific locations: \(a\) traffic noise in İstanbul is between 75-80 dBA, or 10-25 dBA higher than limits in other countries; \(b\) noise measured in Ankara schools averages between 66-81 dBA while the limit is 65 dBA; and \(c\) excessive levels have been measured near building and road construction sites, entertainment facilities and sports installations \(EFT, 1995\).](#)

3.25 **Issues.** The main noise pollution issues (with respect to traffic) are:

- Regulations are not enforced; vehicle noise is not controlled;
- The public has limited awareness about the harm from excessive noise;
- Local authorities have little capacity to identify and address noise pollution problems; and
- Poorly planned traffic flows create greater exposure to high levels of road noise.

3.26 **Options.** See Annex 6, Table 6.7 for the full list. Those with the highest priority are:

- Update and publicize noise control regulations;
- Inform citizens about the risks of exposure to excessive noise, as well as of their rights;
- Develop units within local governments to identify and help resolve incidents of excessive noise pollution;
- Include noise measurements in vehicle inspections; and
- Plan traffic flows and regulate industries with an objective to minimize noise.

B. Natural Resource Management

Water Resources and Quality

3.27 ~~Overall, the country~~the country is well-endowed with **freshwater resources**. Precipitation averages 5014 billion m³ annually. An annual average of 186 billion m³ of the total transforms into flows, while 41 billion m³ seeps underground to form groundwater reserves. There are 48 natural lakes, each with a surface area over 5 km², that extend over 8,900 km², streams exceed 30,000 km., and dam lakes extend over 32,500 km². An estimated ~~95140~~ billion m³ of the annual average surface flow of 186 billion m³ and 12 billion m³ of groundwater reserves of 41 billion m³ are economically and technically exploitable.

3.29 The activity that will most affect ~~water resources~~the water supply regime is the GAP Project, which covers more than 70,000 km² and includes the lower reaches of the Tigris and Euphrates Rivers as well as the upper reaches of the ancient Mesopotamian Valley that lies between the rivers. It includes ~~132~~ sub-projects, which will be completed over the next 30 years, irrigating 1.8 million ha. of land and producing ~~232~~ billion kWh of electricity. These include the Atatürk, Karakaya, ~~Birecik~~ Findikli, and Karkamis dams in the Euphrates Basin and the Ilisu and Batman-Silvan projects in the Tigris basin. The Atatürk Dam, ninth highest in the world, already completed, can irrigate ~~882727~~ 2,000 ha. and generate 2,400 MW of electricity. However, the project will flood some areas, creating wetlands, raising settlement issues, and affecting the biodiversity of the area. EFT, 1996

3.30 Among the 26 **river basins**, the three most important domestic water resources are the Sakarya, ~~Kizilirmak~~ Yesilirmak Rivers. The most polluted rivers (class IV) are listed in Table 3.422.6 along with the

major types and sources of pollution. Threats from this polluted water include insufficient and unhealthy water supply, gastrointestinal diseases, low crop yield from irrigated soil, decreased biodiversity in freshwater, less fish catches from fresh waters, mass fish kills,

Presently, 27% of surface waters and 66% of ground water reserves can be used.

eutrophication in receiving bodies and increased costs for process water. **Lakes** are also important sources of drinking water and/or critical ecosystems. The key lakes at risk are presented in Table 3.53.

On the demand side, only 17% of total freshwater resources are used each year for all purposes. Turkey's total water consumption was 40 billion m³ in 1995. Consumption for irrigation was 74% followed by drinking water (16%) and industrial uses (10%). To put it another way, annual per capita water consumption in Turkey is about 106 m³. This figure is expected to increase due to urbanization, higher income levels and better education.

Table 3.32.5: Water Basins in Turkey

Basin No.	Name	Precip. Area (km ²)	Average Flow/Yr Annual (1/s/km ²)	Basin No.	Name	Precip. Area (km ²)	Average Flow/Yr Annual (1/s/km ²)
1	Meriç-Ergene	14560	2.6	14	Yepilyrmak	36129	5.1
2	Marmara	24100	10.5	15	Kyzilyrmak	79744	2.5
3	Susurluk	23765	6.8	16	Konya	55554	2.7
4	N.Aegean	9032	7.3	17	E.Mediterranean	22484	15.4
5	Gediz	17118	3.4	18	Seyhan	20731	11.1
6	K.Menderes	7165	5.0	19	Asi (Orontes)	10885	3.4
7	B.Menderes	24903	3.9	20	Ceyhan	21222	10.6
8	W. Med.	22615	14.2	21	Euphrates	120917	8.2
9	Antalya	14518	23.1	22	E.Black Sea	24022	21.1
10	Lake Burdur	8764	1.6	23	Çoruh	19894	10.5
11	Akarçay	8377	1.7	24	Aras	27548	5.4
12	Sakarya	56504	3.3	25	Van	15254	5.4
13	W.Black Sea	29582	10.7	26	Tigris	51489	13.6
	TOTAL					766878	209.7

Source: **Land and Water Management and Water Resources Management Sub-Group Report, WG/1, 1996**

The State Hydraulic Works (DSI) projects that the total water requirement of Turkey in the year 2000 will be 58.1 km³ with the following composition: irrigation (72%); drinking water (15%); and industrial uses (13%) (WG/1 1996). Meanwhile, new investments for irrigation, drinking water, industry, and energy are taking place. Large potential demand exists in each sector. For example, irrigation is economically and technically possible for 37.7 million ha. of land. Presently, irrigation is practiced on 4.2 million ha. of agricultural land; this represents 15% of all agricultural land and 16% of all potentially irrigable land (Tekinel, 1995).

Table 3.42.6: River Pollution Sites, Problems and Sources

Basin	River	Pollution	Sources
Meriç	1) Ergene River	1) BOD, suspended	1) Textile & food stuff industries,

	2) Meriç River	matter, alkalis, heat 2) BOD, ammonia, orthophosphate	domestic waste 2) Industries, domestic waste from Edirne
Susurluk	3) Nilüfer Stream	3) DO, BOD, ammonia, COD, orthophosphate	3) Industrial & domestic waste from Bursa
	4) Simav Creek	4) BOD, ammonia, orthophosphate	4) Iborax factory , industrial & domestic waste from Balıkesir & Susurluk
Gediz	5) Gediz River	5) BOD, COD, heavy metals	5) Industrial & domestic waste, irrigation runoff
	6) Nif Creek	6) BOD, COD, nitrogen, phosphorus	6) Metal, textile, chemical, leather & other industries
Sakarya	7) Porsuk Creek	7) DO, BOD, ammonia, nitrate, phosphate	7) Kütahya sewage, industries, power plant
	8) Ankara Stream	8) DO, BOD, ammonia, nitrate, phosphate	8) Domestic & industrial wastes from Ankara
	9) Çark Stream	9) DO, BOD, nitrogen, phosphate heavy metal	9) Industrial & domestic waste from Adapazarı

Source: [EFT, 1995EFT, 1996](#)

Table 3.52.7: Lakes at Risk

Water Body	Characteristics	Risk Factors
Marmara Region		
1) Sapanca Lake	1) Drinking water for Adapazarı, fishery, recreation	1) Domestic, agricultural & industrial runoff
2) Lake Manyas	2) RAMSAR wetland of international importance	2) Wastewater from 34 settlements & 40+ industries, farm runoff
3) Lake Apolyont	3) Irrigation, crayfish production Class A bird habitat Irrigation, crayfish production, potential drinking water source	3) Phosphorus from fertilizers, animal waste, households; sedimentation; eutrophication
Lakes Region		
1) Lake Eber	1) Aquatic ecosystem	1) Afyon sewage, sugar & alkaloid factories, other industries
2) Lake Karamık	2) Aquatic ecosystem	2) Paper factory wastewater
Western Anatolia		
1) Köyceğiz Lake	1) Aquatic ecosystem	1) RSulfur runoff from nearby farmland, forests & canals
2) Gölçük	2) Fishery	2) Agricultural runoff
Tuz Lake	Salt production, saline ecosystem	Potential domestic & industrial waste from Konya discharge canal
Lake Van	1) World's largest soda lake 2) World's fourth largest closed lake ecosystem	1) Lake level rise threatens shoreline settlements & pastures 2) Sewage discharge, industrial wastewater, agricultural run-off, sediment from surface waters

Source: [EFT, 1995EFT, 1996](#)

3.31 Although relatively little information exists on the quality of **groundwater**, special studies indicate the following **inger** problems: (a) sewage infiltration from poorly maintained

septic tanks and sewerage networks, and from detergents in runoff; (b) [leachate from solid waste dump sites](#); (c) toxic industrial chemicals such as cyanide in the groundwater of Kemalpaşa Valley; (d) contamination from agricultural pesticides and fertilizers in the groundwater of Çekirge, Bursa and the Bornova Valley; (e) disruption of water tables from earth moving in water basins and along river banks; (f) salination from over-extraction in the Lakes Region, the Yskenderun-Ulupınar-Arsuz Plain and Çorum, where groundwater passes through brine, mineral waters or geological formations with high salt and sulfite content, and (g) sea water intrusion (e.g. around Çesme, Marmaris and Bodrum).

3.32 **Issues.** The main water resource and quality issues are:

- [Deforestation and poor farming practices accelerate erosion and cause sedimentation of lakes and dams](#);
- [Uncontrolled agricultural runoff from the land and irrigation canals that discharge chemical pesticides and fertilizers eventually pollute surface waters](#);
- [Large water management and hydropower projects such as in the GAP region, if poorly managed, can displace populations, alter the climate and disease vectors, damage cultural heritage and biodiversity, and create salination \(from improper irrigation\)](#). Effective application of the EIA process could prevent adverse effects mentioned above;
- Groundwater suffers from uncontrolled leakage from [septic tanks and sewer lines](#), leachate from solid waste dumps, toxic

waste [dumped on the land](#), [agricultural chemicals](#), and over-extraction from [aquifers](#), which results in [sea water intrusion and salination](#); and

- [Rights, authority and responsibilities for managing water bodies are diffused among many organizations](#) operating under a wide array of laws; such conditions reduce the [effectiveness of interventions to protect and manage water resources](#)

3.33 **Options.** See Table A6.5 in Annex 6 for the full list. Those with the highest priority include:

- Shift to resource management in water basins (institutional reforms, legal changes, data collection);
- Ensure that water use charges are linked to the sustainability of the resource base and are used to operate and maintain the supply;
- Set wastewater charges to account for the quantities generated and nature of the receiving body, and use the revenues to protect water resources;
- Assess the impact of development activities on water quality through effective application of the EIAs.

Soil/Land Resources

~~2.2.3 Causes. Water supply problems are associated with (a) poor operations and maintenance of distribution systems and (b) inadequate access. Public sector distribution networks withdrew an average of 2.96 billion m³ of water in 1992; of this, 1.51 billion m³~~

Formatted: Bullets and Numbering

was recorded as actually consumed, resulting in a water loss rate of 49%. This suggests massive leakage problems in the country's water supply networks. Access to piped water can also be a problem for a particular segment of the population. Nearly 100% of urban dwellers but only 85% of rural residents have access to safe drinking water (World Bank, 1997). Thus, water supply is a problem for certain villages and remote settlements as well as new residents in peripheral and/or illegally settled areas of Turkey's cities (Leitmann and Baharoglu, 1996)

Soil and Land Use

3.3242.4.1 **Quality** Erosion is one of the most severe rural environmental problems affecting 81% In Turkey there are three basic soil zones that share similar climatic and vegetative characteristics and there are two special zones (GDRS, 1987):

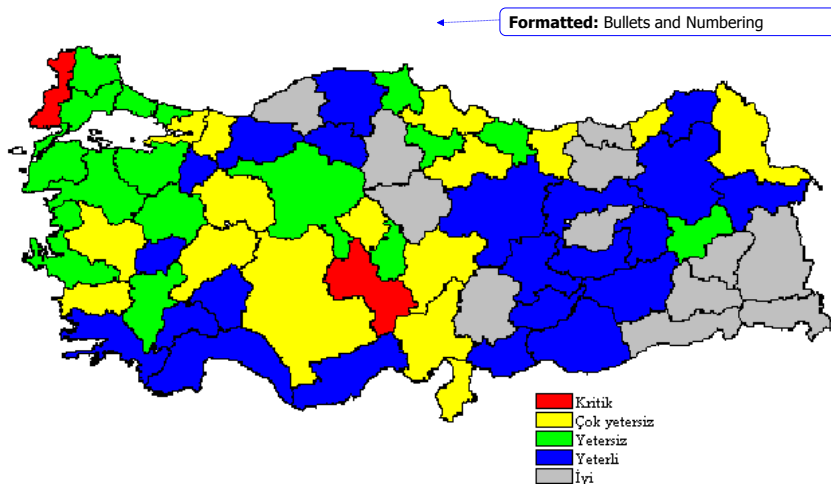
- **Plant-Prairie Zone of Central Anatolia** (26% of soils): average annual precipitation is less than 400 mm, summers are hot and natural vegetative cover consists of herbaceous plants and small trees. This cover changes with altitude and precipitation, giving way to the emergence of brownish and chestnut colored soils which characterize passage to forest soils.
- **Moist Forest Zone** (30% of soils): deep soils with rich humus content (23%) over which trees can grow. They are found in areas with an average annual precipitation of at least 600-700 mm. In Turkey such soils are mostly in the Mediterranean, Aegean and Marmara regions and in the Southeastern Taurus Range, but may also exist in Central and Eastern Anatolia.
- **Mediterranean Zone** (3% of soils): These reddish Mediterranean soils are observed in certain parts of the Mediterranean and Aegean coasts with very hot and dry

summers and winters and springs with high precipitation. These soils cover only 3% of the surface of Turkey. They are naturally covered with scrubs and partly with Brutian pine.

- **Transition Zone** (8% of soils): widely in the Aegean, Eastern Anatolia and Thrace regions in transition from plant zone to forest zone with a mixed vegetation cover of plant prairie bush forest.
- **Unclassified Soils** (29% of soils): distinguished by the properties of their main substance and geomorphology rather than climate and vegetative cover. They are in all basic zones and reach such a variety that they are classified under six groups.

An aggregate picture of land resources is presented in Map 2.1 below.²³

Map 2.1: Land Resources



of the total land surface in varying levels of severity. About 73% of cultivated land

experience 68% of prime agricultural land (Classes I-IV) are ~~prone to erosion being eroded~~. Stream bank erosion affects 57.1 million ha, while wind erosion degrades another 466,000 ha. As a result, about one billion tons of soil are carried away each year.²⁴ The share of area prone to erosion is at a "critical" level in provinces where the share of forested land is also relatively high²⁵ (see Map ~~A9.5~~ and A9.8 in Annex ~~96~~).~~2-2~~ This indicates that agricultural land in these provinces mostly consists of difficult-to-hold soils of steep slopes where agricultural plots have been created through deforestation. The share of ~~extremely~~-severe erosion is also relatively larger in areas where agriculture is practiced without any soil conservation measures.

Erosion has other negative impacts, such as reducing the life of dams through siltation. Although abatement programs were initiated 25 years ago by the Ministry of Forestry, DSI and GDRS, they have only been applied to 2.2 million ha.

3.3~~53~~ Despite its large land mass, Turkey is not rich in cultivable land (see Table 3.~~65~~). Only 24% of its land surface (19.3 million ha.) is suitable for **agricultural land use** (Class I, II or III), partly because the soil is not deep enough: 68% is less than 50 cm deep, and 40% are classified as very shallow. Another 9% can only be tilled after several measures are taken (Class IV and V), while 64% cannot be cultivated at all (Class VI, VII, and VIII): 8% is *stony-rocky*, 7% has drainage problems, and 3% has salinity-alkalinity problems (TOPRAKSU, 1978).

²⁴ According to recent estimates (1980), this is equivalent to the loss of an estimated 87.5 million tons of plant nutrients, assuming the soil contains an average of 0.1% N, 0.15% P₂O₅ and 0.15% K₂O.

²⁵ Maps in this report are based on statistics at a time when Turkey was divided into 67 provinces.

3.3~~46~~ Moreover, the regional distribution of cultivable land is unbalanced (see Table 3.~~65~~): Thirty percent is in the Marmara and central-north regions where population density and non-agricultural activities are relatively more intensive. The shares of cultivable land in these two regions are 43% and 29% respectively. Thus, limited availability of cultivable land, variance in soil structure and imbalances in regional distribution must all be considered when planning for the sustainable use of land resources. Agricultural d

velopments in the GAP region require special environmental emphasis, since, according to preliminary calculations, 1.~~87~~ million ha. will be irrigated when the investments are completed.

Table 3.62-9: Regional Land Capacity for Agricultural Use (%)

Agricultural Regions	Land Classes by Agricultural Region (%) With Respect to Capacity for Agricultural Use							
	I	II	III	IV	V	VI	VII	VIII
1) Central-North	6.62	10.19	12.12	10.94	0.14	15.01	42.37	2.62
2) Aegean	6.28	8.38	7.36	5.81	0.12	14.74	53.50	3.82
3) Marmara	6.52	22.25	17.38	11.27	0.25	14.37	25.99	1.97
4) Mediterranean	7.75	6.78	5.69	5.03	0.42	8.72	57.53	8.07
5) East-North	3.81	7.12	9.02	14.02	0.07	17.29	43.00	5.67
6) East-South	8.35	9.13	9.23	8.38	0.19	11.97	48.50	4.24
7) Black Sea	2.96	3.13	5.95	9.55	0.02	13.06	61.50	3.84
8) Central-East	4.90	6.31	10.12	8.90	0.08	12.40	54.09	3.20
9) Central-South	9.61	10.21	13.71	11.20	0.61	12.86	37.17	6.64

Source: TOPRAKSU, Türkiye Arazi Varlıđı, 1978, Ankara

3.357 Agricultural policies designed to increase yields have changed the composition of production and also expanded and intensified use of inputs: Both outcomes have caused environmental problems. From 1975-1990, chemical fertilizer subsidies increased by 104% at fixed prices and agricultural price support purchases were enlarged to cover 29 different crops. By 1996, price supports were reduced but still covered nine major crops (wheat, barley, corn, tobacco, sugar beet, oats, rye, rice, and poppy seeds). Credit from the Agricultural Bank increased 2.2 times at fixed prices. As a result, irrigated land expanded from 1.2 million ha. (in the 1980s) to over 3 million ha. in 1995. Paralleling this, chemical fertilizer use grew from 2.0 million tons at the beginning of the 1970s to 4.485 million tons in 1995, and the size of land where fertilizers were applied grew from 6 million to 18 million ha.

3.368 In the same period, the use of machinery, which affects the soil, also underwent a structural change. In the early 1970s, there were about 1.5 million wooden plows in Turkey, but by the 1990s, the number was below 400,000. While animal-drawn metal plows decreased by 69%, the number of tractors rose from 150,000 to 777,0004 million. However, efforts to ensure the efficient use of these inputs were not entirely successful. While 44 kg. of fertilizer were needed to harvest one ton of wheat in 1970, 168 kg. were needed to harvest the same amount in 1988 (Alpkent, 1992). The seed required to obtain the same amount of wheat increased by 38% over the same period. Similar increases were observed in the use of pesticides: In the early 1980s, 8 million kg. were used each year, but the figure needed rose to 13 million kg. by 1994. A recent study found that, if in 1970 the efficiency index was 100, the 1990 index in agricultural production was 44 for chemical fertilizers, 74 for irrigation and 29 for tractor use (Talim,1995).

3.379 Due to lack of counter-measures, 83% of all agricultural production suffers from environmental problems. These are partly due to (a) a lack of incentives and penalties to encourage farmers to protect land and water resources; (b) a lack of criteria for extending agricultural credit, subsidies and other supports based on the management of land and water resources; and (c) low levels of farmer training, participation and organization. Turkey's geomorphologic features further exacerbate the process of soil erosion.

3.3840 Land use potential was also reduced by the conversion of agricultural land and industrial pollution. Nationwide, about 1 million ha. of Class I-III land were converted to non-agricultural purposes: In Thrace alone, 25,600 ha. of fertile agricultural land was lost due to highway construction. Similar problems are visible along Izmir-Aydin, Adana-Iskenderun and Amasya-Erbaa-Susehri highways. In addition, besides the pollution from fertilizers and pesticides, pollution from thermal plants, borax mines, and other industrial activities is substantial. For example, 64,000 ha. in the plains of Balıkesir, Kepsut and Karacabey are polluted by borax while 8,000 ha. in Yatağan are contaminated by SO₂.

3.3941 The quality and quantity of pasture and range land vary by region, for example, the amount per unit of cattle is from 0.2 acres in Hatay-7.7 acres in Rize. However, provinces assessed as having "critical" and "endangered" status in terms of the sustainability of pastures and ranges are the same that score positively with respect to land considered as "forest" (see Map A.9.5 in Annex 9). This means that in areas where sustainability of pastures and ranges is relatively restricted, grazing is done mostly on "in-forest" land. -K.Maraş, Zonguldak, Mersin, Muğla, İzmir, Antalya and İstanbul are the forest conservancies where illegal animal grazing is most frequent.

3.402 Animal husbandry is mostly carried out on grasslands and ranges and, according to the 1991 Agricultural Census, it occurs along with crop farming on 96.4% of all 4.1 million agricultural holdings. Also, 12.4 million ha. are used as *permanent pasture and range land*, though it is estimated that animals graze on over 21.7 million ha (Eraç, 1995). Animal husbandry activities comprise 13.6 million cattle and 60.7 million small livestock, 76% of which are sheep. This translates into 2.09 acres of *permanent grassland and pasture* per unit of cattle (PUC). However, only about 300,000 ha. can be used to cultivate fodder crops (vetch, alfalfa, clover and sainfoin). Thus, a single head of cattle needs 35 acres of range land on which it can graze for at least 150 days a year (EFT, 1995). Based on these figures, the current level of animal husbandry can only be practiced by overgrazing, which is particularly severe in the Aegean and Marmara regions, where the PUC is around one acre.

3.413 Finally, two other activities, albeit minor, relative to the other factors, are the cause of land degradation in Turkey: hydropower development and road building which have construction and induced development effects. "For example, 17,000 ha. of Class I, II and III prime farm land has now been converted and developed along 69 kilometers of the Adana-Içel highway."

3.424 **Issues.** The main issues with respect to land degradation are:

- Agricultural practices destroy vegetative cover and lead to erosion. This is due to limited investments in [soil conservation and land rehabilitation](#), agencies' lack of involvement in [eco-basin management](#), and the difficulty of introducing soil conservation measures given the [large number of small agricultural enterprises and the low level of agricultural income](#). It is also due to the practice of farming land that is unfit for cultivation⁶⁰, which leads to deforestation and loss of habitat;
- Use of fertilizers pollutes the [soil](#) (a practice [accelerated by fertilizer subsidies](#) accompanied by the use of improper techniques), as do [industrial emissions](#),⁶¹
- Pesticides banned elsewhere (such as quintozene, prohibited in the US, chloroneb, banned in Europe and metamidophos) are used in Turkey, which pollute the soil and water, and accumulate in the food chain;
- Intensified irrigation (specifically due to the GAP project) may lead to salination, change crop designs that will need heavier fertilization, and increase population which, in turn, will cause farm land to be used for non-farm purposes;⁶²

⁶⁰ At present, 22-% of cultivated land is class VI and VII farmland. In fact, 99.7-% of all such land should be used only as range land, forest or hunting areas.

⁶¹ Studies on potato and tea culture reveal that fertilizer use caused soil and water contamination. From 1958-1960, the share of tea plants where the average pH was lower than 4 was 0.12-%. However, once fertilizers with ammonium sulfate were introduced, which increase the acidity of the soil, the share rose to 40% in 1981, and 85% in 1989. In potato culture, use of nitrous fertilizers exceeded limits: The acidity level of soils where potatoes are grown for example increased a hundred times in Nevşehir.

⁶² According to preliminary estimates, the consumption of nitrous fertilizers, which was 100,000 tons in 1992, will rise to 209,000 tons in 2010; phosphorous fertilizers will rise from 74,000 tons 232,900 tons, potassium fertilizers from 146 tons to 7000 tons, and pesticides from 2,000 tons to 21,000 tons (GAP, 1993).

- Improper irrigation practices and lack of drainage cause salination and lower productivity;⁶³
- Fertile farmland is lost when it is converted to housing, tourism facilities, industries, and roads; and
- Pastures and rangeland are damaged from overgrazing by small animals, which causes more harm to ecosystems (than large animals) and accounts for 77% of the animal inventories.

3.435 **Options.** – No one single project or option can solve Turkey’s dramatic loss of soil cover. Protection of land/soil resources is so complex that it requires radical changes in land use policies and traditions, and in legislative and institutional arrangements. A concerted effort is needed to improve rural conditions and farming practices, coordinate –institutions and reforms, eco-basin management, and involve a wider range of stakeholders. Since 1993 the Eastern Anatolia watershed Rehabilitation project is being implemented in Malatya, Elazığ and Adıyaman in line with a project financed by the World Bank focusing on reforestation, improved range management and environmentally sustainable farming. The project addresses rural poverty and natural resource degradation in the upper sheds of the Euphrates River, where erosion problems appear to be particularly severe. Success has been achieved in increasing the involvement of local communities in the planning and management of local resources; in drafting a legislation to carry out future investments in a collaborative and participatory manner among the related public institutions similar to the process applied in the project. ~~A concerted effort is needed to improve rural conditions and farming practices, coordinate institutions, reforms and eco basin management, and involve a wider range of stakeholders.~~ Often, cultural and social structures, the technology and ecological conditions do not promote soil conservation measures. An extensive list of alternatives to address erosion is presented in Table A6.8 (Annex 6). Those with the highest priority especially to combat erosion are listed below:

- Integrate agricultural support policies with efforts to preserve land resources;
- Develop on-the-job soil conservation related training programs in related institutions and for farmers;
- Ensure farmers’ contribution to land improvement and conservation investments;
- Open channels for participation of farmers into the decision making process for integrated eco-basin management.

Forests

⁶³ In the lower Ceyhan plain, improper irrigation practices led, after 10 years, to a 39% increase in the area where salinity exceeds 1,000 micro-mhos/cm (Tekinel, 1993).

3.446 Forests cover about 26% of Turkey's surface area. However, the to recent surveys and statistics made by the Ministry of Forestry, productive forests cover 48%, and unproductive, degraded areas occupy 52% of total forest area. The ratio of wood harvest to productive capacity has declined from 1.05 in 1980 to 0.77 in 1995 (OECD, 1994). Ninety nine percent are under state ownership and activities related to their conversion, development and expansion are carried out by the State Forestry Enterprises. Total plantations mainly during the planned period since 1962, conducted on degraded and bare forests are about 1,700,000 hectares.

3.457 The forest mix is rich. Forty one percent consist of five pine species, about 2.9% have four fir species, 29.3% have up to 20 oak species, 6.4% have beech, and 1.4% have oriental spruce. The annual sustainable yield (annual increment) is, on average, a relatively low 1.96 m³/ha. About 72% of what is considered productive is found in high forests. Seventy-one percent —of coppices are unproductive. The status of forests is as follows: Production forests, where primarily raw wood is produced (82.6% of all forest cover), protection forests, where land and water resources are conserved (15.7%), conservation forests (1.6%), natural parks (0.2%), and national parks (1.4%) (see Map A96.5 in Annex 96).

3.468 There are 17,797 villages with a total of 8.2 million residents in or near a forest. Studies reveal that, from 1937-1995, as a result of illicit cutting, forest clearing for new farm land, illicit settlement and of illicit grazing two million acres of forest were converted to farm land (or about one per cent of all forest area) and 270,000 acres of forest were settled.

3.479 **Issues.** The main issues with respect to protecting forests are:

- Farming and fuelwood harvesting practices in forest villages are unsound and are the major cause of erosion and deforestation;⁶⁴
- The General Directorate of Forests has insufficient resources (staff and equipment) to protect and manage forests, diffused authority and unclear responsibilities. Also, it uses resources in ways that contribute to degradation. Activities such as harvesting, transporting wood for storage, plantings, and investing in roads, bridges, and facilities have led to erosion, fires, insect and fungi infestations, and exposure to snow and wind damage;
- Cadasters cover only 72% of the forests and in remaining areas property rights are unclear;
- Frequent changes in laws and irregularities in personnel policy complicate management;⁶⁵

⁶⁴ In 1990, 12.2 million tons of wood were consumed as fuel. Of this, only 5.5 million tons were legally harvested. In some regions, all firewood was used to be illegally harvested. This behavior has been a principal cause of deforestation in Anatolia. Recent tendency show that wood consumption as fuel is declining. Therefore, above figures is in decline.

⁶⁵ From 1950-1989, 1.4 million ha. were declassified and removed from the forest regime.

- Reforestation was based on a monoculture approach, which reduced [forest resilience and habitat diversity](#); and
- Ninety-seven percent of the 1,500-2,000 annual forest fires that destroy 11,000-15,000 ha. are [mainly](#) caused by activities of those living in and near [forests](#). Twenty eight percent [are started intentionally, while 24% are from negligent practices such as unextinguished picnic or shepherd camp fires and cigarettes.](#) -Lack of [professional fire-fighting and fire control capacity](#) exacerbates the problem.

3.4850 **Options.** As with soil and land use, no one project or set of options can address the range of problems. See Annex 6, Table A6.8 for the full list. Those with the highest priority are:

- Support participation, education, rights, and development of villagers living in or near forests;
- Modernize forestry services through improved training, equipment, management, and organizational structures; and
- Improve public education and knowledge about forest quantity and quality (e.g. functional and risk classification maps for forests, indicators of sustainable forest management), monitoring, and ways to control forest fires.

[Biodiversity](#)

3.4951 The diverse climate, [geology and soil structure](#) have created a varied [vegetative cover, both spatially \(horizontally\) and by elevation \(vertically\) in terms of species composition and characteristics.](#) [Southeastern Anatolia, the Mediterranean region, the area around the Salt Lake, and the Anatolian Transverse](#)⁶⁶ [have a special importance in terms of plant variety. There are three regions in terms of vegetation cover.](#) -The first, the "European-Siberian Region" covers the Black Sea region and the central and northern parts of the Marmara region. -Here, plants that require moisture dominate along with forest trees. -In the Aegean-Mediterranean region, [vegetation consists of forest trees plus scrubs and a mixture of scrubs and steppe plants.](#) In the Iran region, [steppe plants](#) dominate.

3.502 In [these regions, four sensitive habitats merit special attention: wetlands, mountainous areas, shores, and steppes.](#) Within this largest [wetland endowment of Europe and the Middle East, 300 wetlands include over one million ha., 61 of which are significant bird areas.](#) With its [mountainous terrain and elevations of up to 5,000 meters, there are many mountain ecosystems: 130 mountains with peaks of over 3,000 meters, 10 which have first level priority in terms of winter tourism and sports \(Ülker, 1992\).](#) The shores, another [important ecosystem, have fundamentally different features that require different management approaches.](#) Steppes are also [considered sensitive ecosystems with problems of sustainable utilization. However, no detailed inventory exists.](#) -Many are located in the eastern Black Sea region; 20 have been reserved as

⁶⁶ [The geographical region extending from the Ahır Mountain in the southwest to the Kaçkar range in northeastern Black Sea region.](#)

tourism centers and some have been harmed by noise pollution, solid waste and land development related to tourism.

3.543 Turkey contains 75% of the plant species found in Europe. Cherries, apricots, almonds, figs, and tulips all originated in Turkey, as did domestication of plants. Flora include many wild relatives of important commercial crops such as wheat, chickpeas, lentils, apples, pears, and pistachios. Among continental countries, Turkey ranks ninth in terms of richness of biodiversity; over 33% of its flora are endemic species (Anonymous, 1997). Studies indicate that there are 163 plant families covering 1,225 types which in turn cover about 9,000 species. These grow naturally and about one third are endemic. Of the total of 2,748, 46 may become extinct, 183 are prone to be harmed, 1,701 are scarce, 5 are safe, 798 are scarce and safe, 49 are vague as to their status, and on the remaining 282 species there is insufficient information (Kaya, 1996).

3.524 Turkey has about 120,000 invertebrate, 472 fish (192 of which in inner waters), 426 bird, 8 turtle, 49 lizard, 36 snake, about 20 frog and 120 mammal species. The Biodiversity Strategy prepared in collaboration with the World Bank (1997) classified four of the mammal species and 13 bird species as threatened by extinction; in 1996, the OECD classified 10% of the known species of mammals, 9% of the birds and 4% of the fish as threatened. There are relatively few major protected areas covering only 2,700 km.² (1990), with another 2,000 km.² classified as scientific reserves and national parks. –Protected areas totaled 0.3% of national territory, compared to an OECD average of 7.8%.

3.535 **Issues.** The main issues identified by the Biodiversity Strategy with respect to preserving biodiversity are:

- Rapid population growth, urbanization, industrialization, and tourism development put pressure on the land and ecosystems;
- Illegal forest clearing, overgrazing, plowing rangelands, and unsustainable harvesting of threatened plants threaten the environment;
- Dams, wetland drainage, re-routing of surface waters, and poor irrigation practices and civil unrest in the East and Southeast pose risks to ecologically significant areas;
- Government policies regulating land use (especially rangelands and forests) and natural resource management (especially hunting and gathering of wild animals, birds, plants, and fish), are ineffective;
- Pricing policies harm biodiversity through excessive irrigation and fertilizer use; and
- Rapid tourism development and land speculation degrade coastal habitats (especially along the Mediterranean, Aegean and Marmara seashores) as does introducing foreign crops, cultivators and livestock.

3.564 **Options.** The most important actions of the 77 options listed in the Biodiversity Strategy are as follows:

- Establish protected areas and prepare management plans for endemic domestic species;
- Create new wildlife sanctuaries, refuge centers, breeding stations, and arboretums;
- Provide training on conservation concepts and principles;
- Develop public awareness through cooperation with all stakeholders (agencies, NGOs, media); and
- Educate local communities in the rational use of natural resources.

2.3.2 Causes. Erosion is caused by a number of factors. Poor agricultural practices that result in the rapid loss of vegetative cover and deforestation intensify erosion. This situation is mainly due to: lack of incentives and disincentives that will motivate farmers to take measures for protecting land and water resources; no criteria for managing land and water resources when extending agricultural credit, subsidies and other supports; and low levels of farmer training, participation and organization. Turkey's geomorphological features further exacerbate the process of soil erosion. Despite the severity of the situation, limited resources are invested in soil conservation and land rehabilitation, and relevant organizations do not engage in eco-basin management. Lastly, the average size of agricultural enterprises, level of agricultural incomes and the status of farmers in terms of training all make it difficult to use advanced agricultural technology and to introduce measures for soil conservation.

Agricultural policies aimed at yield increase have, on the one hand, changed the composition of agricultural production, and, on the other, led to the expansion and intensification of agricultural input utilization—both of which have caused environmental problems. Between 1975 and 1990, chemical fertilizer subsidies increased by 104% at fixed prices and agricultural price support purchases were enlarged to cover 29 different crops. Agricultural credit extended by the Agricultural Bank increased 2.2 times at fixed prices. As a result of these policies, land under irrigation expanded from 1.2 million ha. (in the 1980s) to over three million ha. in 1995. Paralleling this, consumption of chemical fertilizers increased from 3.5 million tons (at the beginning of the 1970s) to 10 million tons in the 1990s, and the size of land where fertilizers were applied grew from six million to 16 million ha.

In the same period, the use of agricultural machinery, which has important effects on soil, also underwent a structural change. At the beginning of the 1970s, there were about 1.5 million wooden plows in Turkey. In the 1990s, this number fell below 400,000. While the number of animal drawn metal plows decreased by 69%, the number of tractors rose from 150,000 in the early 1970s to four million in 1994.

However, efforts to ensure the efficient use of these inputs were not entirely successful. For example, while 44 kg. of fertilizer was necessary to harvest one ton of wheat in 1970, 168 kg. of fertilizer was needed to harvest the same amount of wheat in 1988. The amount of certified seed needed to obtain the same amount of wheat increased by 38% over the same period (Alpkent, 1992). There were similar increases in the use of agricultural pesticides. At the beginning of the 1980s, eight million kg. of pesticides were being used annually; this rose to 13 million kg. in 1994.

According to a recent study, if 1970 = 100, the 1990 efficiency index in agricultural production was 44 for chemical fertilizers, 74 for irrigation and 29 for tractor use (Talim, 1995).

In addition to the effects of agricultural inputs, land use potential is reduced by two other factors: (a) conversion of agricultural land; and (b) industrial pollution. Nationwide, about one million ha. of Class I-III land has been converted to non-agricultural purposes. Meanwhile, in addition to fertilizers and chemicals used for pest control, the extent of area and air polluted by thermal plants, borax mines and other industrial activities has reached significant dimensions. For example, 64,000 ha. of land in the plains of Balykesir, Kepsut and Karacabey are polluted by borax while 8000 ha. of land in Yatađan is contaminated by SO₂.

The composition of livestock is also an important indicator in terms of the sustainability of **pastures and ranges**. Rearing small animals, especially goat breeding, may create more harm to ecosystems with trees. Yet, in Turkey 77% of all animal inventory consists of small animals, and goats have a share of 23 % among these. The share of goats in the small animal stock is as high as 96 % in Antalya and 68 % in Ýgel.

Finally, two other activities are significant causes of land degradation in Turkey — hydropower development and road building. Installed hydropower capacity reached 9933 MW with 99 hydraulic plants in 1996. When plants presently under construction are phased in, the number of such plants will be 510 and installed capacity will reach 35,455 MW. Construction and operation of hydropower dams can damage plant cover, water and land resources, and cultural assets by reservoir creation and changes in the climatic conditions of the area concerned. In addition, dam and reservoir construction can cause involuntary displacement and resettlement. The effects of the Keban and other dams on the ecological and cultural assets of the lower Euphrates as well as on human and animal health can be cited as examples of such negative environmental consequences.

In Turkey, 71% of freight and 82% of passenger movement takes place by road. 412,000 kilometers of roads have been constructed as of 1995 and there are about 3.5 million motor vehicles operating on these roads (SPO, 1995/a). Road transportation leads to several types of land degradation:

- Highway construction may harm agricultural lands, pastures and forests in many ways. Surveys show that in Thrace alone 25,600 ha. of fertile agricultural land was lost as a result of highway construction. Similar problems are visible along Izmir Aydyń, Adana Iskenderun and Amasya-Erbaa Supehri highways;
- Excavations and fillings made during road construction accelerate erosion and soil loss, and may lead to the pollution of water resources;
- Highways can accelerate the mushrooming of buildings along the roadside. For example, along the 49 kilometers of Adana Içel Highway, 17,000 ha. consisting of I,II and III-class farm land is now covered by buildings (AKPINAR, 1996); and
- Heavy metals such as lead and bitumen emitted during traffic, as well as CO, SO₂, NO_x and HC, have adverse effects on human health as well as nearby land, water and plants. According to the findings of a survey made on Adana Içel Highway, the lead limit value of 0.2 mg/kg has been exceeded by all plants at a distance of 5-25 meters to the highway. Lead values of 1.85 and

2.17 mg/kg in plants at a distance of five meters to the highway were observed to be 1.8-1.23 at a distance of 10 meters, and 1.9-2.13 at a distance of 25 meters (Kumbur, 1996).

C. *Marine and Coastal Resources*

3.557 The seas around Turkey are generally distinct from each other. This restricts water exchange, and it is thus more difficult to dilute or flush wastes discharged to these seas. Also, vertical mixing of water masses stops below a certain depth (especially in the Sea of Marmara and Black Sea), which concentrates pollutants within each strata. The cause of the separation varies. The narrow straits of the Bosphorus and Dardanelles that, respectively, connect the Black Sea to the Sea of Marmara, and the Sea of Marmara to the Aegean Sea, block the confluence of these waters. The Aegean Sea's connection to the rest of the Mediterranean is constrained because of many islands, including Crete and Rhodes.

3.568 The ~~the marine context~~, coastal areas, with their 8,333 km of shoreline, and about 160 islands, with another approximately 9,000 km of shoreline, constitute important ecosystems. Each coastal zone has different features that require different management approaches. Information on each sea is presented below.

3.579 With a surface area of 2.5 million km², **the Mediterranean** is the largest inner sea in the world. About one third of the water lost by evaporation in the sea is renewed by fresh water inflows and a continuous surface inflow from the Atlantic Ocean. The northeastern Mediterranean has a narrow continental shelf; oxygen exists at all depths; a westerly current moves along the Turkish coast; average salinity is around 0.38‰; average annual water temperature is 15-17°C; and the total annual discharge to the sea is 36,300 m³, entirely from streams. -Because of coastal settlements and high maritime traffic, this part of the sea is very sensitive to pollution.

3.5860 Annual discharge sea from rivers and sewage canals is 36.3 billion m³, 99% of which are river effluents. Although industrial wastewater constitutes less than 1% of the total volume, it contains highly toxic substances such as mercury, lead, chromium, and zinc (EFT, 1995). ~~EFT, 1996~~ Agricultural activities constitute the largest volume of pollutants carried to the sea by rivers and streams: 90% of tobacco and sunflower seed production, 80% of cotton and corn output and 70% of rice growing occurs in the coastal provinces (OECD, 1992). Farming activities contribute 58% of COD, 29% of phosphorus, 24% of nitrogen, and 14% of BOD.

3.5961 Critical coastal and near-shore areas along Turkey's portion of the Mediterranean include: (a) the Bay of Iskenderun which has both special hydrological features (shallow bottom, upwelling, potential for aquatic products) and an inflow of domestic and industrial wastewater; (b) the coast from Kemer to Alanya (including the city of Antalya), which has recently experienced rapid population and tourism growth that, in turn, overloaded the environmental infrastructure and disrupted the ecology (from construction along the coast); ~~and~~ (c) the Goksu delta which is a specially protected area because of its value for waterfowl preservation and reproduction; and (d) various shoreline areas where secondary homes and tourist facilities are densely developed. The sea is also home to the Mediterranean monk seal which is one of the 12 most endangered species in the world. Of the 300-400 thought to exist, about 50 live on desolate parts of this coast.

3.642 With a coastal perimeter of 2,805, the **Aegean Sea** is one of the five distinct basins of the Mediterranean. The north-south length is 660 km, while its width is 270 km. in the north, 150 km. in the center, and 400 km. in the south. The surface area is 214,000 km² and average depth is 100-150 meters. Due to currents, its water movements are extremely varied. The Sea has three distinct oceanographic features. In the northeast, less saline waters of Black Sea origin flow as a surface current to the Aegean through the straits and then turn west with a cyclonic bend. Away from the straits, water stratification, arising from different levels of salinity, becomes less pronounced. Also, northern winds peculiar to the region stir up the waters.

3.643 Wastewater discharges into the Aegean occur at nearly 50 major points along the coast (seven rivers, at least 40 tourism and vacation home developments, one industrial zone, and input from the Black Sea) as well as at a number of domestic sewage outfalls. -The total pollution load from these sources is equal to a population of 20 million, 10 million of which comes from Black Sea discharges. To this, a load of 7.5 million population equivalent should be added from adjacent Greek settlements and industries for a total load equal to that of 27.5 million people. Localized pollution problems include high levels of suspended solids, dissolved/dispersed petroleum hydrocarbons, mercury, and cadmium. EFT, 1996 BOD, nitrogen and phosphorus from sewage discharges in the northern Aegean are expected to nearly double from 1990-2010.

03.642 Critical coastal and near-shore areas include: (a) the Bay of Izmir whose inner bay suffers from organic pollution from Izmir's sewage, heavy metal concentrations from industries and petroleum and other ship wastes from port activities; (b) the Çandarlı Bay that is polluted by tanker traffic, refineries and tanker-filling installations as well as organic loads from the Bakırçay and Büyükcik Menderes Rivers; and (c) the coastline from Kuşadası to Marmaris, which has experienced rapid population and tourism growth, ~~and~~ the construction of secondary homes, with associated pollution and ecosystem disruption.

3.635 **The Black Sea** extends over 1,200 km. from east to west and 600 km. from north to south. -With a base of 422,189 km², it is a semi-inland sea. Total water volume is 536,969 km³, 87-% of which is deep water without oxygen. -The water collection basin is 2.2 million km² and the average depth is 1,272 meters; -37% of the sea floor is deeper than 2,000 meters. The shallow sections (less than 200 meters) are to the north and west and constitute 27%. Average salinity is 0.18-0.19-%, increasing below 100 meters and reaching 0.22% around 200 meters. -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 km³. However, the Sea also receives a 312 km³ average annual inflow of saline water from the Mediterranean through the counter current along the Bosphorus.

3.646 The pollution load is relatively high from natural causes and waste 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. It is also an aquatic environment where bacteria found in sewage can remain alive longer than in Turkey's other seas due to relatively low solar radiation, water temperature and salinity. The sea is rich in plankton and in the fish that live on

this biomass making it Turkey's most important fishery. However, catches have been declining due to overfishing and the Sea's changing ecosystem, resulting from a new ctenophore (*Mnemiopsis*) introduced through the ballast water of ships. The ~~dEFT, 1996~~ [damage to fish hatcheries may be occurring due to shoreline erosion](#). ~~Fishing catch dropped from 800,000 tons a year in the early 1980s to 100,000 tons, at present. 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.~~

[03.657](#) **The Sea of Marmara** also displays peculiar hydrodynamic features because of the structural character of the straits that connect it to other seas. It extends over 11,350 km² and has 3,377 km³ of water, and waters of Black Sea and Aegean origin form two distinct strata. In the south, there is a wide and relatively shallow shelf, but to the north, depths are over 1,000 meters extending from east to west. Its oceanographic features vary in line with those of the Aegean and Black Sea, as it is connected to these two seas. Water temperatures vary according to seasons. Less saline (0.16-0.18%) surface waters of Black Sea origin and the deep waters of Aegean origin with higher salinity (0.38-0.39%) form two strata with limited confluence. The oxygen saturation of waters at 25-30 meters vary from 20%-30%, which poses a problem in the decomposition of coastal discharges and organic substances coming from the Black Sea.

[3.668](#) An estimated 766 million m³/year of wastewater are discharged into the sea; this figure does not include wastewater from industries in metropolitan [İstanbul](#), since no detailed inventory exists. Organic matter equal to 158,000 tons of BOD and 370,000 of COD are discharged annually into the surface waters of the Bosphorus at its junction with the Marmara. Eutrophication, declines in phyto- and zooplankton, disappearance of certain fish species, and significant algal growth have been measured in recent years. ~~One species of algae, *Gracilaria*, has grown enormously and is being collected commercially for export (EFT, 1995).~~ [E](#)

[3.679](#) Critical coastal and near-shore areas include: (a) the Bay of [İzmit](#), which receives waste from Turkey's most important industrial area as well as the domestic waste of the city of [İzmit](#); and (b) Gemlik Bay, which receives pollution from Lake [İznik](#) as well as industrial and household waste from adjacent towns via [Göçelayağçığı](#) Stream.

[3.6870](#) **Fisheries** are important in all the seas: The country's fish yield ranks 50th in the world with an annual catch of about 600,000 tons, up from 300,000 tons a year at the beginning of the [1990s](#). An estimated 247 species are in the Black Sea, 200 in the Sea of Marmara, 300 in the Aegean, and 500-550 in the Mediterranean. 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. In fact, 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).

[3.6971](#) Fishing practices and overfishing have taken a heavy toll especially in the Black Sea. Less than 30% of the stock of deep sea fish in Turkey are [unsustainably](#) harvested and stocks are continually decreasing. With respect to techniques, the troll nets used in deep water fishing also pull in small fish and affect the species composition of the ecosystem. Further, disregard for restrictions on the age and length of fish to be netted reduces existing stock as well as the diversity of the

species. Some of these problems are inadvertently caused by laws and regulations: As a consequence of poor enforcement For example, fishermen ~~are allowed to~~ catch young fish in spite of ~~without~~ restriction. With respect to overfishing, 1991-1993 surveys on resources revealed that for six species and all fishing zones, 60% of the all deep sea stocks are caught. This rate is considered too high to sustain deep sea fish and other living marine resources.

3.702 As a result, the number of economically viable fish in the Black Sea has dropped. While there were 26 different types in the 1960s, there are now only five (Kuri, 1995). ~~Annual fish production from the Sea dropped from 300,000 tons in 1988 to 50,000-100,000 tons by 1995.~~ ~~EFT, 1996~~ Although there are about 500 species of fish in the seas surrounding Turkey, only 50 to 60 have economic value. Just one surface fish known as *hamsi* or anchovy/sardine (*Engraulis encrasicolus L.*) accounted for 60% of the 1994 marine catch. Other than marine fish, an average of 42,000 tons of fresh water fish (approximately 8% of the total production) are produced each year (SIS, 1996b).

3.7+3

Aquaculture has increased in recent years and has negatively affected marine ecosystems: Together with water soluble waste, solid particles composed of uneaten feedstock and fish excrement cause pollution in both inland aquatic and marine ecosystems. ~~Analyses show that these pollutants consist of 20% uneaten feedstock, 40%-45% raw protein, 10% raw fat, 14%-15% ash, 3%-5% cellulose, 12% water, and 13%-18% macro and micro-elements.~~ ÜZGÜNEP

3.74 **Tourist Growth and Coastal Development** have mushroomed as a result of legislative and institutional arrangements designed to encourage tourism investment. However, while 60% of tourist settlements have adequate drinking water, 76% have no sewerage and another 13% have limited sanitation. Infrastructure for waste collection and disposal is inadequate. Only 5% of such settlements are satisfactory. In addition, three of Turkey's largest, fastest growing and/or most industrialized cities are coastal: Istanbul on the Bosphorus and Sea of Marmara, Izmir on the Aegean Sea, and Antalya on the Mediterranean Sea. Overall, 5148% of the country's population live in coastal provinces. Density in coastal provinces averages 127 people/km² compared to 73/km² nationally, according to 1990 census data. An estimated 70%-80% of all industrial output is also generated in these provinces.

3.735 This uncontrolled growth and development pressure has been one of the main causes of coastal and near-shore degradation and environmental problems in the Mediterranean, Aegean and Marmara Seas. Water demand is met mostly from groundwater reserves. When the water table lowers due to excessive use, it is prone to seawater infiltration, which decreases water resources for agriculture. The same process has denuded and salinated tangerine, olive and fig growing areas in the Aegean region. Also, pollution caused by buildings and accelerated construction of marinas along the coast have often exceeded regulations. For example, in Akçay, Çesme and Kuşadası, fecal coliform counts were above the limit. † Of the 7,700 ha. of land used for tourism, 69% are fertile, mostly of the highest quality (Class I and II). Finally, haphazard coastal construction has destroyed the natural landscape and created visual pollution in many areas.

3.746 **Maritime transport** is an additional source of marine pollution from accidents in areas with heavy traffic, especially petroleum transport, and improper disposal of ballast and bilge waters and solid waste. In 1996, about 140 cargo vessels and 1,000-1,500 passenger boats 3000 vessels a month navigated the Bosphorus Straits and the Sea of Marmara each day, transporting a yearly average of 42 million tons of cargo: 35% of the vessels were tankers and 38% of total cargo was petroleum. In the same year, 101 vessels a day transited the Dardanelles Straits. From 1970-1991, there were 3-35 oil spills a year releasing 50,000-700,000 tons of oil, causing an estimated 10% of the pollution load. On an average day, there are 1315 vessels transiting the Bosphorus, and 400 vessels in the Sea of Marmara. In İstanbul alone, 94 ferries make about 750 roundtrips a day and carry 125 million passengers a year. ~~In the region, 95 sea accidents occurred in 1991 and 1992, 38 of them taking place on the Bosphorus. Sea accidents have declined, dropping from 43 incidents in 1990 to 12 in 1994 and only 2 in 1996. However,~~ Maritime traffic will be even heavier when connections are made between the Danube and Rhine, and Rotterdam and the port of Constanza in Romania are linked.

3.757 **Issues.** The main issues with respect to marine resources are:

- Rapid tourism investment and development, encouraged by legislation, have generated waste and degraded the groundwater, agricultural land and cultural/ historical resources;⁶⁷
- Growth is not managed in a way that effectively controls the effects of industrial and domestic waste discharges, housing development, road construction, and sea-filling on the coast;
- Accidents and spills, the disposal of solid waste at sea and environmentally insensitive port and marine development, threaten marine resources; and
- Fishing practices and overfishing are unsustainable, especially for the Black Sea.

⁶⁷ Land allotments made under the Forestry, Coast and Tourism Incentives Acts are accelerating damage to national and natural parks, and coastal ecosystems.

3.768 **Options.** See Annex 6, Tables A6.52 and A6.10 for a full list of options to improve coastal and marine management. Those with the highest priority are:

- Manage growth more effectively. This will involve protecting marine and coastal ecosystems, using EIAs more widely for coastal development, and reforming institutions to better implement existing measures;
- Internalize tourism's impact on pollution by covering the cost of solid and liquid waste disposal, water supply and protection of historical, cultural and natural assets;

BOX 3.5: TOURISM AND COASTAL AREAS

Turkey is rich in natural and historical assets that have made tourism one of the fastest growing sectors since the 1980s. Income from tourism was US\$326 million in 1980, and US\$7.0 billion in 1997. The number of tourists swelled to 9.6 million in 1997, and the share of tourism in total foreign exchange earnings was nearly 13%.

Development is concentrated mainly along the coast extending from the Çanakkale-Balikesir provincial boundary in the north to the Antalya-Mersin provincial boundary in the south. Data show that of all certified beds, 27% are in Aegean region, 25% in the Mediterranean region, and 21% in the Marmara region. Investments in vacation homes have also concentrated in the same areas. Rates of growth of the service sector and urbanization are above national averages in these areas, partly due to tourism's multiplier effect. As a result, in the [coastal municipalities/provinces](#) of Balıkesir, İzmir, Aydın, Muğla and Antalya, 32% of the land area has been occupied by vacation homes and 14% has been set aside as "areas for tourism."

- Involve local communities more widely in planning and implementing tourism investments;
- Address pollution and risks from maritime transport by more strictly enforcing safety and pollution control measures, and by better monitoring and development of emergency preparedness systems for certain waterways; and
- Improve 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.

2.5 Forests

~~2.5.1 Status. Forests cover about 26% of the surface area of the country. However, 56% of this forest cover is unproductive and consists of degraded areas. The ratio of wood harvest to productive capacity has declined from 1.05 in 1980 to 0.77 in 1995 (OECD, 1994). Forests are almost wholly under state ownership and activities related to their conversion, development and expansion are carried out by the State Forestry Enterprises. Of the 20 million ha. of land classified as forest in 1994, 59% was natural forest, 37% was reforested, 3% was degraded forest, and the remainder was coppice or maquis. The reforested component has steadily increased from only 14% in 1985.~~

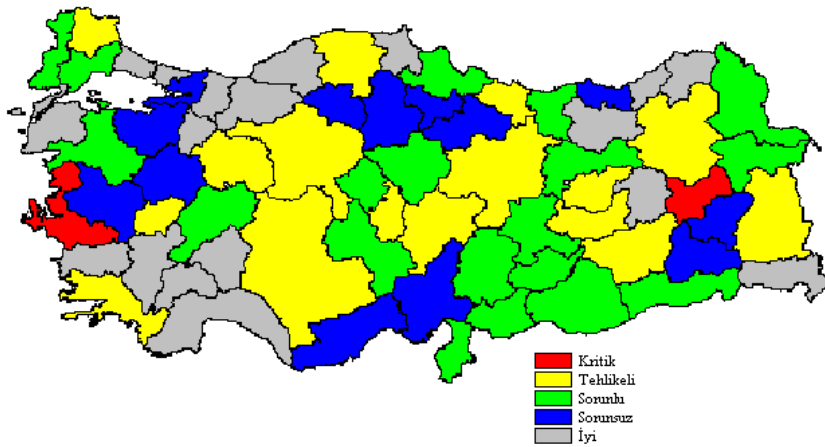
In Turkey, 70% of what is considered to be *productive forest* is found in *high forests* and 54% of the forests of Turkey are classified as high forest. 71% of "unproductive forests" are coppices. The forests of Turkey have a rich composition in terms of tree species: 30% of forests consist of five pine species, about 1% with four fir species, 23 % with up to 20 oak species, 3.3% with oriental beech, 0.7% with oriental spruce, 5.5 % with mixed coniferous cover, 18.5% with mixed foliated trees, and 4.5 % with mixed forests of coniferous and foliated trees.

The annual sustainable yield (annual increment) of forests in Turkey is, on average, 1.96 m³/ha, while the annual increment is 3.42 m³/ha. for *productive coniferous high forests* and 0.28 m³/ha. for *unproductive coniferous high forests*. For *foliated high forest*, the relevant figures are 5.16, 0.51, and 3.66 m³/ha. for productive, unproductive and average yields. In summary, the average annual increment figures are 2.02 m³/ha. for high forests, 2.39 m³/ha. for what is classified as *productive coppices*, and 0.20 m³/ha. for *unproductive coppices*. These three figures indicate an average of 0.85 m³/ha. (SPO, 1995/d). Thus, the wood yield of areas classified as "forest" is relatively low.

In Turkey, the management status of areas classified as forests is as follows: *Production forests* where primarily raw wood is produced (95.5% of all forest cover), *protection forests* delineated for the conservation of land and water resources (1.5%), *conservation forests* (0.4%), *natural parks* (0.3%), and 2.3 % are managed as *national parks* though such patches do not wholly consist of forests. The existence and overall sustainability of forest resources is summarized in Map 2.4 below.

2.5.2 Causes. There are 17,800 villages in or near what is considered forest and 8.2 million people live in these settlements. In these "forest villages", the level of income is believed to be below the national average. Farming is practiced mostly on high steep slopes cleared from forest cover, and animals are left to graze within forests. Fuelwood is gathered from nearby forests. Studies reveal that in forests with adjacent settlements, each year there are 16,000 cases of *illicit cutting*, 5000 cases of forest clearing for new farm land, 2000 cases of *illicit settlement* and 6000 cases of *illicit grazing*. Between 1937 and 1995, as a result of such actions, two million acres of forest land have been converted to farm land and 270,000 acres of forest land was settled.

Map 2.4: Existence and Sustainability of Forest Resources



Demand for energy is another prime cause of deforestation. In forest villages, according to a detailed survey made by the General Directorate of Forestry, in 1990 12.2 million tons of wood was consumed annually as fuel. Of this, 5.5 million tons were legally harvested while 6.7 million tons were obtained illegally. This figure may rise to 19.5 million tons in 2000, and to 19.7 million tons in 2010 (SPO, 1995/d). In some regions, all firewood consumed is illegally harvested from nearby forests. This behavior is one of the principal causes of deforestation in Anatolia. For example, a survey conducted in the forests of Gerede in Bolu showed that while there were 9.2 million cubic meters of wood (construction and fire wood) within the boundaries of the state forest enterprise in 1967, it fell to 9 (?) million cubic meters in 1980. Almost all this reduction took place as a result of illegal (?) firewood consumption.

In Turkey, there are 1500-2000 forest fires annually that destroy 11,000-15,000 ha. of forests. One of the main causes of forest fires is the subsistence activities of people living in and near forests. According to the General Directorate of Forestry, 28% of all forest fires in Turkey are started intentionally while 24% of such fires start from negligent practices such as unextinguished picnic or shepherd camp fires and cigarettes. Another contributing factor is the lack of professional firefighting and fire control capacity.

The inconclusive state of forest cadastral works, in turn, makes the ownership status of areas classified as forest uncertain. Cadastral work has covered only 60% of the forests of Turkey and this inconclusiveness aggravates the pressures on areas where cadastral work has not yet begun. In addition to these uncertainties, frequent changes in forestry related legislation and senior officials as well as legislative arrangements encourage forest devastation in Turkey.

The General Directorate of Forestry faces various institutional, legal, staffing, and equipment constraints. Also, diffusion of authority and responsibility among various units gives rise to redundancies and clashes. This also contributes to the failure of activities such as the protection of forests against natural damage (i.e. insects, fungi, snow and wind) and afforestation. 2.3 million acres of land has since 1962 been deforested because of the technical shortcomings in forestry work. This loss of forest cover took place in the eastern Black Sea Region between 1963 and 1983 (412,000 acres), in the Antalya Forest Conservancy from 1965 to 1971 (5,000 acres) and nationally during the period 1973-1984 (1.8 million acres) (Çağlar, 1989). Also, during and after GDF activities such as harvesting, transporting wood for storage, infrastructure investments (i.e. road, bridge, buildings, other facilities), and planting work (species selection, soil preparation, monoculture formation) events that damage forest ecosystems may occur such as erosion, fire, insect and fungi infestations, and exposure to snow and wind damage.

2.6 Biological Diversity

2.6.1 *Status*. 75% of the number of plant species found in the whole of Europe can be found in Turkey. One third of Turkish flora, which is more than twice as diverse as that of neighboring countries, is found only in Turkey. Cherries, apricots, almonds, figs, and tulips all originated in Turkey. Domestication of plants first took place in this region. Turkish flora include many wild relatives and genetic diversity of important commercial crops such as wheat, chickpeas, lentils, apples, pears, and pistachios. Among continental countries, Turkey ranks ninth in terms of richness of biodiversity with over 33% of its flora as endemic species (Anonymous, 1997).

There are about 120,000 invertebrate, 472 fish (192 of which in inner waters), 426 bird, 8 turtle, 49 lizard, 36 snake, about 20 frog and 120 mammal species in Turkey. Four of the mammal species and 13 bird species were classified as threatened by extinction as of 1994 (World Bank, 1997). The OECD classified 10% of Turkey's known species of mammals, 9% of its birds and 4% of its fish as threatened (OECD, 1996).

Studies have shown that in Turkey there are 163 plant families formed by 1225 types which in turn cover about 9000 species. These species grow naturally and about one third of them are endemic. According to data obtained at the end of 1993, there are 2748 endemic plant species in Turkey. Out of this total, 46 are *under the threat of extinction*, 183 are *prone to be harmed*, 1701 are *scarce*, 5 are *safe*, 798 are *scarce and safe*, 49 are vague as to their status, and for the remaining 282 species there is insufficient information (Kaya, 1996).

— Diversity in climate, geology and soil structure has led to diversity in vegetative cover both spatially (horizontally) and by elevation (vertically) in terms of species composition and characteristics. Southeastern Anatolia, the Mediterranean region, the area around the Salt Lake, and what is called the *Anatolian Transverse* have a special importance in terms of plant variety. The latter is the geographical region extending from the Ahyr Mountain in the southwest to the Kaçkar range in northeastern Black Sea region. In Turkey, there are basically three regions in terms of vegetation cover. The first one is the "**European-Siberian Region**" covering the Black Sea region and the central and northern parts of the Marmara region. Here, plants that require moisture are dominant together with forest trees. In the **Aegean-Mediterranean** region, vegetation cover consists of forest trees plus scrubs and a mixture of scrubs and steppe plants. In the **Iran Region**

steppe plants are dominant. The variety of vegetation cover also changes with respect to altitude. Still, this vertical variation itself varies with respect to locality.

Within these regions, four sensitive habitats merit special attention: wetlands, mountainous areas, shores, and plateaux. Turkey has the greatest **wetland** endowment in Europe and the Middle East: there are 300 wetlands of more than one million ha. each, 61 of which are significant bird areas. With its mountainous terrain and elevations of up to 5000 meters, Turkey has many **mountain ecosystems**. In total, there are 130 mountains with peaks of over 3000 meters, ten of which have *first level priority* in terms of winter tourism and sports (Ülker, 1992). The **shores** of Turkey are also important ecosystems. The total continental shoreline is 8333 km.. About 160 islands add an additional 9000 km. of shoreline. Additionally, 48 lakes with a total surface area of more than 8900 km², 58 reservoirs and pools each of which has an area of at least 5 km², and stream banks that should also be included. Each have fundamentally different features that require different management approaches. **Plateaux** are also considered as sensitive ecosystems with problems of sustainable utilization. However, no detailed inventory exists. Many of them are located in the eastern Black Sea region; 20 of such highlands have been reserved as "tourism centers" by the Ministry of Tourism.

2.6.2 *Causes*. A biodiversity strategy is currently being prepared in Turkey. According to this document, loss of biodiversity and sensitive habitat is caused by:

- the pressure on land and ecosystems stemming from rapid population growth, urbanization and industrialization;
- detrimental rural activities such as illegal forest clearing, overgrazing, plowing of rangelands, and uncontrolled gathering of plants;
- destruction of ecologically and culturally significant areas by construction of dam reservoirs, drainage of wetlands, re-routing of surface waters, and poor irrigation practices;
- lack of effective government policies regulating: land use (especially for rangelands and forests); hunting and gathering of wild animals, birds and plants; and fishing;
- economic policies such as low water tariffs that lead to inefficient irrigation practices, and salination as well as agricultural incentives that result in excessive use of pesticides and fertilizers, both contributing to loss of biodiversity;
- land speculation and rapid tourism development leading to degradation of coastal habitats along the Mediterranean, Aegean and Marmara seashores; and
- introduction of foreign varieties of crops, modern cultivars and foreign livestock breeds.

Finally, there are relatively few major protected areas in Turkey. 2700 km.² were designated as protected areas in 1990, with another 2000 km.² classified as scientific reserves and national parks. Protected areas amounted to 0.3% of national territory compared to an OECD average of 7.8% (OECD, 1994).

2.7 Waste Management

2.7.1 *Status*. Waste management in Turkey involves domestic and industrial solid waste and wastewater. 22.3 million tons of municipal solid waste was generated in 1991, corresponding to 392

kg. annually per capita. Waste collection services reach most households in Turkish cities and towns. In the major cities, winter waste is composed of: 45-50% food wastes, 5-10% recyclables and 40-50% ash, slag and other non-recyclable waste. During the summer, this composition changes to: 80-85% food wastes, 15-18% recyclables and 1-3% non-recyclables. Paper, glass, metal, and plastic constitute the major recyclables. According to a 1991 survey, 80% of municipal solid waste was disposed of in open dumps, 15% in seas, lakes and rivers, 2% was composted, 1% was placed in sanitary landfills, and 2% was burned in the open, buried or dumped in agricultural land (SIS, 1992 & 1993). Open dumps experience problems with leachates that cause surface and groundwater contamination, odor, fires, and methane gas explosions (see Section 2.9 on natural and man-made environmental risks); sea, lake and river dumping pollutes these water bodies; and open burning contributes to air pollution. In 1992, Turkish citizens recycled 27% of paper and cardboard waste and 40% of glass; this increased to 36% for paper and cardboard in 1995 but fell to 24% for glass. In comparative terms, Turkey's solid waste generation rate is considerably below the OECD average of 500 kg./capita (OECD, 1996).

25.0 million tons of industrial solid waste was produced in 1992, or 116 kg. per \$1000 of GDP. Of this, 47% was sold, 36% was sent for ultimate disposal, 15% was recycled or reused, and 2% was unaccounted for. Power plants generated another 12.3 million tons of solid waste, or 3861 tons per Mtoe (SIS, 1993). These figures include an estimated 300,000 tons of hazardous waste or 1.6 kg. per \$1000 of GDP. This is nearly ten times less than the OECD average of 15.8 kg. of hazardous waste generated per \$1000 of GDP (OECD, 1994). Recycling rates in the non-household sectors of the Turkish economy are relatively low; some kind of recycling is done by 22% of firms in the service and commercial sectors, 21% of industries, 25% of hotels, and 18% of restaurants. Of those firms that recycle, 75% collect newspapers and magazines, 46% packing paper, 14% metal, and 9% paper and glass in 1992. Just over half of the firms used some of the collected materials in their own establishment, 43% sold or gave the recyclables away, 18% burned some of the materials, and 6% gave some recyclables to the garbage collector (SIS, 1995).

— Nearly 94% of the Turkish population is not served by municipal wastewater treatment; this compares to an average of only 40% across the OECD (OECD, 1994). In 1992, industries added 70,350,019 m³ of sewage to the municipal load (SIS, 1995).

In the industrial and manufacturing sectors, 843,334,071 m³ of wastewater from industrial processes and 70,350,019 m³ of industrial sewage were discharged in 1992. 69% of wastewater from industrial processes was discharged with no treatment, 18% received some treatment and 13% received some pre-treatment. 58% of the industrial sewage was discharged with no treatment (SIS, 1995). Table 2.10 gives the pollution load for selected wastes (BOD, COD, heavy metals) for all public and private enterprises that did not have treatment facilities in 1992. Public enterprises produced a sizable amount of Turkey's wastewater pollution load.⁶⁸

Table 2.11: Industrial Wastewater Pollution Load, 1992

⁶⁸ These figures should be considered lower bounds as they are based on a survey of 1,870 enterprises with 25 or more workers that represent 88% of total production and 76% of industrial sector employment.

* originates from both industrial processes and sewage from industrial facilities

** copper, lead, cadmium, zinc, and chromium

Source: SIS, 1995

2.7.2 Causes. Turkey's waste management problems are caused by a number of factors:

• **Low level of investment**—some of Turkey's major cities are only now building or operating their first sanitary landfills (e.g. Ankara, Istanbul, Izmir, Izmit), wastewater treatment plants handle only 6% of domestic and less than a third of industrial effluents and there are few facilities to handle hazardous wastes. Only one integrated waste treatment project is near completion, albeit in the highly polluted area of Izmit; it consists of a sanitary landfill for municipal and industrial solid waste, an incinerator for hospital and hazardous waste, a wastewater treatment plant, a sewage interceptor, and river rehabilitation at a cost of 464 million DM (US\$273 million);

• **Lax performance of state enterprises**—parastatals generated 54% of industrial solid waste as well as 57% of BOD, 51% of COD and 42% of the heavy metal pollution load in 1992. Yet, 54% of industrial solid waste from state enterprises was sent for ultimate disposal (rather than being recycled, reused or sold) compared to 21% for private firms. 74% of industrial wastewater from state enterprises was discharged without any treatment compared to 47% for the private sector. Rather than setting an example of good practice, state enterprises are the worst polluters;

• **Low level of awareness**—a solid waste control regulation emphasizing recycling and safe disposal came into effect in 1991. However, a recent survey of nearly 2000 municipalities indicated that none were enforcing the regulation; more than half cited economic constraints and a third had inadequate staff, vehicles or technical skills. One third of the municipalities were unaware that the regulation existed.

D. Cultural and Natural Heritage Sites

3.779 Preservation of many cultural, historical and natural assets has been included in laws such as those on Forests, National Parks, the Preservation of Natural and Historical Assets, the Environment, Coasts, and the Bosphorus. Turkey has 3229 national parks, four of which were given this status for their historical significance; 119 natural parks; 5438 natural monuments; 32 natural preserves; 97118 wildlife preservation areas; 9071003 natural entities and 39640 natural sites; 3,0292768 archeological sites; 1186 urban sites; 11551 historical sites and 19947 others of different merits; 319,0847 examples of civilian architectural heritage; 5,265009 religious, 5,1264754 cultural, 755632 administrative, and 39782 industrial/commercial structures; 159682 cemeteries; 18279 cemeteries for martyrs; 18955 mausoleums and monuments; 702676 historical remains; and 123 special protection areas, shores and coastal strips. Other natural and historical assets may be listed within legislative acts on Public Works, General Hygiene, Agricultural Combat Activities, Agricultural Quarantine, and Ground Water Reserves, as well as various regulations and international conventions. The most popularly visited sites are: Hierapolis, Denizli; Efes, Izmir; Alanya Fortress; Aspendos, Antalya; Zelve Ruins; Underground city in Kaymaklı; Perge, Antalya; Underground city in Derinkuyu; Troia, Çanakkale; and Side, Antalya

03.8078 **Issues.** The main issues with respect to cultural and natural heritage are:

- Legal and illegal tourism can place large numbers in contact with fragile sites, relics and ecosystems, causing their degradation;

- Large development projects such as dams, transport networks, housing estates and agriculture have been submerged, altered or severely degraded existing and potentially valuable areas;
- The Ministry of Culture does not have enough resources to preserve and manage cultural, historical and natural sites; and
- Natural phenomenon such as fires, earthquakes, floods, and landslides have may damaged or destroyed artifacts and areas; theft is also a problem.

3.7981 **Options.** A full set of options is listed in Annex 6, Table A6.11. Those with the highest priority are:

- Increase visitors' awareness about protecting the sites, charge higher entrance fees and ensure the largest part of revenues is used to protect resources;
- Improve the implementation of EIAs and monitoring to ensure that measures to mitigate the negative effects on historical and cultural assets are included;
- Increase the Ministry of Culture's effectiveness by involving local communities, NGOs and the private sector more widely in planning and implementing protection measures; also, improve its management of information and planning and give regional structures more autonomy;
- Conduct more research and provide access to international examples of good practice and resource mobilization, to protect assets from natural hazards; and
- Stress culture and history at all educational levels, conduct public information campaigns, and give awards for research and protection activities to increase awareness.

E. Natural and Man-made Environmental Hazards

3.802 Turkey's geology, topography and climate provide a setting for many types of disasters. Over the past 70 years, an estimated 600,000 houses have been damaged, roughly 66% by earthquakes, 15% by floods, 10% by landslides, 7% by rock falls, and 2% by meteorological events and snow avalanches. More than 51% of the population, 75% of industries and 43% of the land mass are located in the two most vulnerable earthquake zones. Thus, over the same period, about 70,000 people have been killed and 120,000 injured in 55 major

BOX 3.6x—2.1: EARTHQUAKES IN ERZINCAN

In December 1939, a massive earthquake measuring 8 on the Richter scale hit the plain of Erzincan in the upper Euphrates basin: 32,000 were killed, 17,500 were injured, 117,000 buildings were destroyed, and 230,000 were left homeless.

In March 1992, the city was again struck. This time it measured 6.1, caused more than 500 deaths, injured over 700, destroyed 110 structures of four or more stories, damaged more than half the buildings, and caused an estimated 10 trillion TL in losses.

quakes. Even now, 1.1 million are at risk of being made homeless and 40,000 in İstanbul occupy buildings that could collapse in a severe earthquake. -Engineers estimate that fewer than 25% of buildings in urban areas conform to the earthquake building code.

3.8+3 The average annual loss from quakes amounted to 0.8% of GNP while losses from all other natural disasters were 0.2% of GNP a year. Recent estimates place the cost of a catastrophic earthquake in İstanbul and İzmir at over US\$100 billion. In addition, human behavior such as smoking, and driving that results in traffic accidents constitute major environmental hazards in Turkey whose economic impact has yet to be assessed.

3.8342 Citizens and ecosystems are also exposed to various man-made hazards:

- A landslide of 1.2 million m³ of solid waste at the Umraniye-Hekimbaşı open dump site on the Asiatic side of İstanbul in April 1993 inundated 11 houses and killed 39 people. A combination of action and inaction led to the accident.
- -Human activity produced the 1,500-2,000 daily tons of solid waste disposed of at the site.

Failure to act properly included: (a) the gradual construction of illegal houses by scavengers and their relatives in a risk-prone location below the dump site; (b) absence of waste compaction; (c) the build-up of a steep mountain of waste; (d) failure to cover dumped material with soil; (e) lack of on-site methane venting; (f) persistence of landfill fires; and (g) placement of heavy construction waste on top of the unstable waste slope;

- Traffic accidents killed 5,347,600 and injured 111,059,319 in 1996, for a rate of 7536 deaths and 1,562 injuries per 100,000 vehicles--the tenth worst accident rate in the world;
- Maritime accidents such as the 1979 Independenta-Evriali tanker collision in the Sea of Marmara killed 43 and spilled 48,000 tons of crude oil. Beaches and the marine environment were devastated. The clean-up took several years, regional tourism revenues declined 40%, and fisheries' output dropped 25%;
- The collapse of an ash and dust containmentwaste dam at the Seyitömer thermal power plant in May 1997 contaminated 2,000 acres of productive farmland ~~and caused an estimated 500 billion TL (US\$3.6 million) in damages;~~ and
- Forest and other fires also contribute to degrading the environment.

3.8453 **Issues.** The main issues with respect to natural and man-made hazards are:

- Human [behavior increases exposure to risks](#), such as building homes or businesses in [risk-prone areas](#), maintaining [protective systems](#) poorly, failing to provide [noise controls](#), and failing to enforce [building and noise codes](#) (see Box 3.76).
- Not enough has been invested to improve the safety of [facilities](#) and industrial processes.
- [Traffic accidents, resulting in serious damages in human life terms and economic costs, along the highways is one of the top man-made hazard issues.](#)
- There are too few [emergency preparedness measures](#).

BOX 3.76: FLOODING IN ÝZMÝR

In 1995, heavy rains in Ýzmir caused floods that killed 63 people, mostly in slum areas. A detailed analysis concluded the damage was primarily due to poorly functioning drains and culverts that were blocked with solid waste.

Three human activities caused this disaster: (a) poor people seeking low-cost housing constructed illegal dwellings in riverbeds; (b) solid waste collection was inadequate so residents dropped it in the drains; and (c) drains were poorly maintained, which allowed the waste to accumulate to where the drains could not function properly.

3.8564 **Options.** In the NEAP preparation process, no working group addressed natural/[man-made risks](#), although the issue of [noise pollution](#) was considered (see [Table A65.47 in Annex 65](#), for the full list of options). Those with the highest priority are:

- Take measures to deal with culture and habits, along with technical activities, to introduce the concept of unacceptable noise levels; and
- Develop emergency response systems. Create noise prevention zones created [around highways and industrial enterprises](#).
- Implement public awareness campaigns about the health risks of smoking and driving practices, along with measures for road and car safety.

F. Priority Geographic Areas

2.10 Hot Spots

3.867 There are a number of priority geographical areas in Turkey where several different environmental problem areas converge and create concentrated impacts. The following preliminary list of areas is a result of literature review, an overlay analysis of environmental related data and expert discussions at the NEAP synthesis report review workshop. The list is not

comprehensive and should be updated periodically. It, however, does provide useful guidance for geographically focusing the action plan. -These areas are:

- **Urban slums.** These areas, known as *gecekondu*, are generally built on illegally occupied land or constructed without permission, and house 20 million people. Residents are harmed by limited access to environmental infrastructure and services such as potable water, sanitation, waste collection and drainage; greater exposure to man-made hazards such as air pollution, pedestrian accidents and industrial emissions; and greater vulnerability to natural hazards as houses are often poorly constructed and located in risk-prone areas.
- ~~GAP project area—the GAP region, one of the oldest civilization centers in the world, has experienced a number of environment related problems: (a) land degradation due to deforestation, overgrazing, poor farming practices, and rapid population growth; (b) insufficient basic infrastructure; and (c) low levels of income, education and environmental awareness (GAP/UNDP, 1995). Major new investments, especially dams and irrigation, are creating new environmental effects such as changes in disease vectors, intensified urban risks, flooding of vast areas of land, loss of historical heritage, and localized climate change. In the past, these investments were planned and implemented without formal consideration of environmental management or impact. The region's population was 5.2 million in 1990, growing at 3.5% annually.~~ **CCanakkaleFethiye-~~YcelAlanya~~ coastal zone.** The most developed part of the Mediterranean coast suffers from a mix of environmental risks: rapid population growth combined with inadequate infrastructure; rapid tourism development; pressure on natural, cultural and historical sites; agricultural runoff; and pollution from marina and harbor development. The area has over 5 million residents and receives most of the tourists (about 7.7 million in 1997).
- **Sea of Marmara and its hinterland.** Ecosystems in the Sea of Marmara are threatened by domestic wastewater discharges and urban runoff from metropolitan ~~Y~~stanbul and other cities; industrial air and water contaminants; pollution from the anchoring, loading, unloading, and waste disposal activities of ships; and the unique hydrodynamics of the Sea that limit natural purification. -These problems persist despite actions such as the Golden Horn Investment Project and the ~~Y~~stanbul Metropolitan Waste Project. ~~EFT, 1996~~ The coasts of the Marmara are home to Turkey's densest population and industrial centers.
- **~~Y~~zmir Bay and environs.** The L-shaped Bay along the Aegean coast covers about 920 km², houses over 3 million, and has been seriously degraded by: (a) very low dissolved oxygen caused by heavy loads of domestic and industrial wastewater; (b) heavy metal pollution from industry; (c) waste from port activities; and (d) hydrodynamic features that cause stagnation and intensify pollution in certain parts of the Bay. The nearby ~~B~~üyükdik and ~~K~~üçük Menderes and Gediz water basins are also heavily polluted. The partly completed Great Canal Project has found it difficult to address the problems.

~~EFT, 1996~~

- **Ýstanbul Province**. Turkey's most populous province generates large amounts of solid and liquid wastes from the Ýstanbul ~~İzmit~~ and other industrial areas, along with municipal solid waste and sewage; its cultural and historic sites are degraded, it experiences high levels of winter air pollution, and is vulnerable to earthquakes and maritime accidents;
- **GAP region**. This area, with a population of 5.2 million in 1990, is one of the oldest civilization centers in the world. Current development has already intensified the environmental problems: (a) the land is degraded due to deforestation, overgrazing, poor farming practices, and rapid population growth;

(b) the area has insufficient basic infrastructure and low levels of income, education and environmental awareness (GAP/UNDP, 1995);(c) major new investments, especially dams and irrigation, have changed the disease vectors, intensified urban risks, flooded vast areas of land, destroyed some historical heritage, and produced some localized climate change; (d) these investments were planned and implemented without formal consideration of environmental management or impact; and (e) civil unrest has caused migration, accelerated urbanization and damaged ecosystems.

4. TOWARDS A NATIONAL ENVIRONMENTAL ACTION PLAN

In preparing the NEAP, its strategic objectives were first established, followed by a set of principles on how to achieve these objectives. Based on these principles, a number of action areas, comprising several specific actions, were put forward for consideration. To rank these actions and determine their relative priority, specific criteria were generated through a stakeholder participatory process. This chapter presents the criteria, strategic objectives and principles that were used to formulate the action plan and then reviews the short and medium-term actions of the NEAP. The main components of the NEAP are actions for: developing a more effective environmental management system; enhancing information and awareness; and investing in improved environmental management. Finally, the NEAP implementation strategy is outlined with sections on initial implementation, monitoring and evaluation, updating and revision, and possible sources of finance.

A. Formulating the Action Plan

4.1 Inputs from the Participatory Process. The fundamental basis for the NEAP comes from the participatory process described in Annex 1. This process had the following characteristics: (a) the outcomes were based on qualitative judgments, i.e. a type of Delphi process where the judgment of experts and other stakeholders was used rather than formal analysis using, for example, cost-benefit calculations; (b) the methodology did not require the participants to explicitly rank priority environmental problems but instead had them focus on prioritizing solutions that could cover a range of problem areas; and (c) the ranking process generated criteria and ranking of weights (see

Table 4.1) and a set of priority actions (summarized in Annex 6) but these were not linked to particular problem areas, cost estimated, scheduled, or otherwise organized in a plan. The criteria were weighted as participants felt that some criteria were more important than others. These criteria were then used to rank the action groups through a process described in Annex 1. The relative weights and prioritization of action groups were determined through a participatory process. Thus, the prioritized actions coming from the participatory process had to be interpreted and formulated into a plan. This was done using an explicit set of strategic objectives and principles that are listed below.

Table 4.1: Criteria Developed to Rank Action Groups

Criteria and Weighting	Explanation
ECOLOGICAL BALANCE (Relative weight = 0.323)	Improvements in environmental conditions for the sustenance of flora and fauna; impact of ecological cycle on the preservation and sustenance of natural processes.
HUMAN HEALTH (Relative weight = 0.315)	Improvements in environmental conditions of individuals and communities; impact of such improvements on development in qualitative and quantitative terms.
CULTURAL, HISTORICAL, AESTHETIC VALUES (Relative weight = 0.200)	Impact of improvements in environmental conditions on the identification, preservation and development of cultural, historical and aesthetic assets.
ECONOMIC PRODUCTIVITY (Relative weight = 0.161)	Effect of improvements in environmental conditions on resource utilization; impact of such improvements on the level of economic development

4.2 **Strategic Objectives** The following objectives of the NEAP were selected to be directly focused on environmental concerns, achievable and measurable:

- **Reduce or prevent pollution** - the NEAP should result in a situation where environmental damage is decreased or avoided altogether. This helps achieve the goals of Management and Development;
- **Improve access to basic environmental infrastructure and services** - the NEAP should help Turkish citizens to enjoy better environmental quality. This supports the goals of Quality of Life, Management and Development;
- **Encourage sustainable resource use** - the NEAP should help stakeholders to use renewable resources more sustainable. This contributes to the goals of Awareness and Development;

- **Support sustainable environmental practices** - the NEAP should promote policies, programs and projects that sustain the environment and the economy. This assists in attaining the goals of Awareness, Management and Development; and
- **Minimize vulnerability to environmental hazards** - the NEAP should reduce human and ecological exposure to natural as well as man-made risks. This supports the goals of Quality of Life and Management.

4.3 **Principles.** Preparation of the NEAP has been guided by an explicit set of principles to ensure that the plan can be successfully implemented. The basic principles for formulating environmental protection and management measures are:

- **Use democratic and participatory mechanisms** - democratic processes will be used

to implement solutions. Public participation will require: empowerment and access to relevant information; institutionalization of stakeholder involvement; and support to enhance the effectiveness of participants;

- **Seek consensus and commitment** - solutions to environmental problems must be based on social consensus. Oppressive measures cannot yield sustained results. Thus, voluntary commitment must be the basis for pursuing environmental protection and management activities;
- **Combine efficiency and economic rationality** - inefficient use of resources is one of the basic causes of environmental problems as well as a source of reduced economic productivity. Behavioral change should be sought by pursuing “win-win” options that improve the efficiency of resource use and yield higher economic returns;
- **Coordinate and internalize priority actions** - with limited resources, priority must be set and pursued. Sustained implementation of priority actions will require coordination between key stakeholders and internalization of concerns for protecting and managing the environment; and
- **Decentralize solutions to the appropriate level** - environmental problems can often be solved at the local level; however, planning and resource allocation in Turkey are highly centralized. Problem

identification, option development, decision-making, and implementation should be decentralized to the lowest effective level.

B. Priority Actions

4.4 **Logic of the Action Plan.** The key findings of the NEAP preparation process can be summarized as follows:

- the existing system of environmental management, assessed in Chapter 2, is not up to the task of addressing many of Turkey’s key environmental issues;
- enhancing information and awareness are the highest priorities identified by the participatory process for the NEAP; and
- the problem areas, reviewed in Chapter 3, will require specific new investments in order to protect, manage and rehabilitate Turkey’s environment.

Thus, the NEAP is organized in three components that parallel these findings: (a) a program and supporting actions to develop a more effective system of environmental management; (b) actions for enhancing information and public awareness; and (c) investments for critical problem areas.

Table 4.2: Action Program for Enhancing Environmental Management System

<i>Action Areas</i>	<i>Actions</i>
Economic/Financial Instruments	<ol style="list-style-type: none"> 1) Review existing pricing policies to remove environmentally harmful subsidies and introduce environmentally beneficial cross-subsidies, e.g. to make unleaded fuel more competitive 2) Regularly assess other macroeconomic policies (taxation; municipal financing; agriculture, energy, forestry, industry and tourism development strategies) to evaluate and mitigate negative environmental consequences; 3) Identify opportunities for enhancing environmental regulations with more use of economic instruments (effluent and emission fees, user charges, cost recovery, product fees, marketable permits, deposit-refund schemes, performance bonds, liability assignments) 4) Reform the Environmental Pollution Prevention Fund and other relevant funds to finance priority actions identified in the NEAP and make its management more participatory 5) Use standard approach to setting utility charges based on long-run marginal costs that incorporate environmental protection, management and rehabilitation expenses
Institutional Reform	<ol style="list-style-type: none"> 1) Review existing institutional, financial and technical instruments for accelerated implementation of EIA procedures & introduce environmental auditing procedures 2) Introduce guidelines to improve the environmental performance of parastatals 3) Accelerate privatization of state enterprises and incorporate criteria for environmentally responsible behavior in the privatization process 4) Strengthen the authority and resources of local governments to analyze and solve environmental problems 5) Modify SPO's internal procedures so there is environmental screening of investments through collaboration between the environment sector and other sectors 6) Establish environmental units and programs in each governmental agency to assess environmental performance and recommend improvements
Legislative Arrangements	<ol style="list-style-type: none"> 1) Modify legislation and administrative arrangements to institutionalize stakeholder participation in environmental planning, decision-making and implementation, including public interest law suits and local referenda 2) Assess proposed amendments to decree for establishing the ME and Municipal Act to determine the extent to which environmental variables are incorporated
Planning	<ol style="list-style-type: none"> 1) Incorporate environmental concerns in the national, regional and local plans. Local environmental problems, eco-basin activities, and priority actions should be identified in the plans. 2) Change the method and scope of urban development and environment plans to integrate environmental variables
Inventory/Research	<ol style="list-style-type: none"> 1) Identify and compare organizations and agencies that directly or indirectly affect the environment in terms of their objectives, working systems, instruments, priorities, and resources; determine measures to increase efficiency, cooperation & participation 2) Determine the quality and quantity of existing and potential resources that can be utilized for the protection and management of the environment 3) Inventory the obligations, constraints and opportunities that originate from international conventions, agreements, treaties, protocols, and declarations 4) Collect and evaluate information on enforcement and compliance with existing environmental regulations 5) Assess the nature, level and potential for community participation in environmental management 6) Regularly survey public awareness and concern about environmental issues and public participation in environmental management

4.5 Actions for Development of an Effective Environmental Management System.

The highest priority set of actions is to make the existing system for environmental management more effective. Significant resources are being used by the existing system. However, the current system is often ineffective because it: relies on regulatory command-and-control mechanisms which are not supported by efficient institutional capacity and not blended with rather than a blend of market instruments; limits public participation; does not take full advantage of available information; is over-centralized; and is not well-understood by stakeholders. Thus, the current system in Turkey lacks the power to manage problem areas, issues are addressed in an *ad hoc* manner and long-term solutions cannot be sustained. Reform begins with a program of urgent low and no-cost actions that should be taken to enhance the existing system. Then, supporting actions (studies and projects) are described in greater detail.

Before taking action to enhance the existing environmental management system, two thorough studies are required to help **improve the institutional and legislative framework**. The first would review the authority and procedures of environment-related institutions and make recommendations to improve their effectiveness, avoid duplication, increase public participation, and support coordination. The second would assess the **legal framework** for environmental management to harmonize conflicting legislation, remove loopholes, expand opportunities for public participation, and identify legislative changes.

4.6 Some of the actions in this program are no or low-cost policy measures that will require political commitment to be carried out. Other changes can be supported through a series of concrete, short- and medium-term actions to (a) improve the institutional and legal framework and (b) integrate the

environment into development planning. Descriptions of priority actions in each of these categories are summarized below. More details are provided in the project briefs in Annex 7, including their justification, scope, implementing organization(s), related stakeholders, estimated cost, and time horizon for implementation. These projects have been formulated based on the priority action groups ranked during the NEAP participatory process (see Annex 1, Table A1.10) and the options identified by the working groups (see Annex 6) as well as examples of good practice.

4.7 Turkey's system of development planning at the national, regional and local levels needs to be urgently reformed in order to place environmental considerations on the agenda. Priority projects for **integrating the environment into development planning** in Turkey include: identifying eco-basins; local environmental action planning; making the EIA process more effective; classifying and planning land use capacity; completing and managing rural cadastral works; and preparing and implementing national productivity action plans. Project briefs for both the institutional/legal studies and the integration projects can be found in Annex 7, Table A7.1

4.8 **Enhancing Information and Awareness.** The NEAP participatory process concluded that the two highest-priority action groups should be: 1) development and efficient operation of reliable, renewable environmental information production systems that are terminologically and conceptually consistent, and 2) implementation of training and social marketing programs for building awareness among stakeholder groups. Two projects proposed in the NEAP for enhancing environmental information and awareness are: managing environmental data for improving analysis, decision-making and public awareness; and environmental education and training that would be conducted through both

formal and non-formal channels. Better environmental information and a better-educated public could help address all of the problem areas identified in Chapter 3 by (a) broadening government and public perception about the risks and costs of a degraded environment, (b) helping government to more efficiently focus resources on priority problems, and (c) increasing public pressure on the political system to tackle environmental issues. More on these projects is presented in Annex 7, Table A7.2.

4.9 Investing in Improved Environmental Management. New investments are needed in each of the problem areas that have been covered in Chapter 3. To tackle Turkey’s key problems of the **urban environment**, projects are proposed to: improve waste management; encourage clean technologies and energy sources; and upgrade urban slums. To improve **natural resource management**, a large investment is proposed to upgrade rural environmental infrastructure. Investments for protecting and managing Turkey’s biological diversity are already included in the national biodiversity strategy

and so are not part of the NEAP. In addition, all of the actions for integrating the environment into development planning should contribute to improved natural resource management. To protect and manage **marine and coastal resources**, a project has been formulated to improve management of the coastal zone. To protect **cultural and natural heritage**, an investment for environmental management in the GAP region is included as a priority. For **environmental hazards**, a project has been outlined to reduce environmental risks. This activity would also help to protect valued cultural and natural resources. More details on each of these proposed investments can be found in Annex 7, Table A7.3.

4.10 Summary of Action Plan Studies and Projects. Table 4.3 provides a summary of the studies and projects that are proposed for the NEAP’s three components. Information is included on the strategic objective that is being addressed, the lead agency for implementation and the time horizon.

Table 4.3: Summary of NEAP Studies and Projects

Study/Project	Term	Objective(s)	Lead Agency
1. ENHANCING ENVIRONMENTAL MANAGEMENT SYSTEM Institutional & Legislative Framework			Prime Ministry + SPO + ME
1.1 Harmonizing Institutional Setting	Short	All objectives	

1.2 Harmonizing Legislative Framework Environment & Development Planning	Short	All objectives	Prime Ministry + SPO + ME
1.3 Identifying Eco-basins	Short	Sustainable resource use	MoF, MARA, DSI
1.4 Local Environmental Action Planning	Short	All objectives	Local governments
1.5 Making the EIA Process More Effective	Short	Reduce/prevent pollution	ME
1.6 Classifying and Planning Land Use Capacity	Medium	Sustainable practices Sustainable resource use	GDRS
1.7 Completing Rural Cadastral Works	Medium	Sustainable practices	Cadastry G.D.
1.8 Preparing & Implementing National Productivity Action Plans	Medium	All objectives	SPO + National Productivity Ctr.
2. IMPROVED INFO. & AWARENESS			
2.1 Managing Environmental Data	Medium	All objectives	SIS
2.2 Environmental Education and Training	Short	Sustainable resource use & practices; vulnerability	ME + Ministry of Education
3. INVESTING IN ENVIRONMENT			
Urban Environment			
3.1 Improving Waste Management	Short	Reduce/prevent pollution Improve access	ME + local governments
3.2 Encouraging Clean Technologies and Energy Sources	Medium	Reduce/prevent pollution Sustainable practices	Ministries of Energy + & Industry & Trade
3.3 Upgrading Urban Slums	Short	Improve access	MPWS + local governments
3.4 Upgrading Rural Environmental Infrastructure	Medium	Minimize vulnerability Improve access Sustainable practices	GDRS
Marine and Coastal Resources			
3.5 Improving Coastal Zone Management	Short	All objectives	MPWS + local govts
Cultural and Natural Heritage			
3.6 Environmental Management for the GAP Region	Short	All objectives	GAP Regional Administration
Environmental Hazards			
3.7 Reducing Environmental Risks	Medium	Minimize vulnerability	MPWS+ local govts.

4.11 **Estimated Timing.** The NEAP is intended to be implemented over a 20-year period. Only short- and medium-term projects have been selected for the NEAP. Figure 4.1 presents an approximate timeline for implementing the set of NEAP programs and projects. Activities have only been identified for the short-term (implementation during the first five years of the NEAP period) and the medium-term (implementation during the first ten years of the NEAP period). Additional

measures will be identified for the second half of the NEAP period based on various inputs: (a) the results of regularly collected NEAP implementation indicators (see Annex 86); (b) mid- and end-of-project evaluations; (c) an overall NEAP performance reviews every two years; and (d) periodic Government reviews such as the preparation period for the Five Year Development Plans and meetings of the Environment Council.

Figure 4.1: NEAP Timeline

Actions	Year:	Term:	Short					Medium					Long						
			1	5	10	15	20	1	5	10	15	20	1	5	10	15	20		
Action Program for Enhancing Environmental Management System			=====																
1.1 Harmonizing Institutional Authority and Procedures			=====																
1.2 Harmonizing the Legislative Framework			=====																
1.3 Identifying Eco-basins			=====																
1.4 Local Environmental Action Planning			=====																
1.5 Making the EIA Process More Effective			=====																
1.6 Classifying and Planning Land Use Capacity			=====																
1.7 Completing & Managing Rural Cadastral Works			=====																
1.8 Preparing/Implementing National Productivity Action Plans			=====																
2.1 Managing Environmental Data			=====																
2.2 Environmental Education and Training			=====																
3.1 Improving Waste Management			=====																
3.2 Encouraging Clean Technologies/Energy Sources			=====																
3.3 Upgrading Urban Slums			=====																
3.4 Upgrading Rural Environmental Infrastructure			=====																
3.5 Improving Management of the Coastal Zone			=====																
3.6 Environmental Management for GAP Region			=====																
3.7 Reducing Environmental Risks			=====																
Collection of NEAP Indicators			=====																
Performance Reviews of NEAP				*	*	*	*	*	*	*	*	*	*	*	*	*	*	*	*
Design & Implementation of Long-term Actions			=====																

4.12 Implementation Matrix. The management of environmental problems is, by its nature, cross-sectoral and multi-jurisdictional. Implementation of the NEAP will involve a number of different lead or implementing organizations because of the cross-sectoral nature of environmental problems. Implementation will also require the involvement, cooperation and coordination of a range of stakeholders because of the multi-jurisdictional nature of environmental issues.

Table 4.4: Implementation Matrix

Lead Agency	Project/Activity	Related Stakeholders
Prime Ministry + ME + SPO	1.1 Harmonizing Institutional Authority & Procedures 1.2 Harmonizing the Legislative Framework	1.1 Relevant ministries, local governments, parastatals, NGOs, universities, professional groups 1.2 Various ministries, parastatals, local governments, professional organizations, NGOs, universities
ME	1.5 Making the EIA Process More Effective	1.5 Various ministries, public enterprises, SIS, universities, private sector, NGOs
ME + Ministry of Education	2.2 Environmental Education & Training	2.2 Various ministries, private sector, NGOs, universities
ME + local governments	3.1 Improving Waste Management	3.1 Ministries of Forestry, Health, Industry & Technology, Education, Defense, & Public Works, Energy; SIS, STRIT, Privatization Administration, private sector, universities
Ministry of Forestry + Ministry of Agriculture + DSI	1.3 Identifying Eco-basins	1.3 ME, SPO, BIB , GDF, GDRS, Administration of Electricity Surveys, universities, local governments, NGOs
State Institute of Statistics	2.1 Managing Environmental Data	2.1 DSI, ME , SPO, Ministry of Health, Bank of Provinces, Local Env. Boards, local governments, universities, NGOs, R&D orgs.
Cadastry General Directorate	1.7 Completing & Managing Rural Cadastral Works	1.7 Ministries of Agriculture, Forestry, Treasury & Interior, GDAR, Union of the Chambers of Agriculture, private sector
SPO + National Productivity Center	1.8 Preparing & Implementing National Productivity Plans	1.8 Various ministries, universities, private sector, NGOs
GDRS	1.6 Classifying & Planning Land Use Capacity 3.4 Upgrading Rural Environmental Infrastructure	1.6 Ministries of Agriculture, Forestry, Public Works, Environment, and Energy & Natural Resources; DSI; GDAR; SIS, universities 3.4 Ministry of Public Works, GDF, GAP Administration, special provincial administrations, Provinces Bank, local governments
Mins. of Industry & Trade + Energy & Natural Resources	3.2 Encouraging Clean Technologies/Energy Sources	3.2 ME, DSI, Privatization Administration, TUBITAK, local governments, private sector, universities, NGOs
GAP Regional Administration	3.6 Environmental Action Planning for the GAP Region	3.6 Ministries of Forestry & Health, DSI, GDAR, GDRS, AEC, State Highways, local governments, universities, private sector, NGOs, special provincial administrations
Ministry of Public Works & local governments	3.3 Upgrading Urban Slums 3.5 Improving Coastal Zone Management 3.7 Reducing Environmental Risks	3.3 Treasury, Bank of Provinces, private sector, NGOs 3.5 Ministries of Forestry, Agriculture, Health, Environment & Tourism, special provincial administrations, private sector, universities, NGOs 3.7 Ministries of Health, Defense, Education & Environment, private sector, universities, NGOs
Local Governments	1.4 Local Environmental Action Planning	1.4 Ministries of Interior, Public Works, Tourism, Forestry & Health, Bank of Provinces, unions of municipalities, universities, research institutes, private sector, NGOs

Lead agencies for NEAP implementation, their responsibilities and related stakeholders are listed in the following implementation matrix.

4.13 **Costs.** Very rough cost estimates for each NEAP project are presented in Annex 7. At a minimum, the NEAP would cost over US\$300 million during its first ten years. Little work has been done in Turkey to estimate the potential benefits of improved environmental management. Moreover, it is difficult to accurately quantify the benefits making qualitative benefit judgment acceptable. In general, the benefits of the NEAP will include: better health for the citizens of Turkey; increased economic productivity; more efficient use of existing public sector resources; improved sustainability of natural ecosystems; and increased amenities and aesthetic benefits. An indication of the magnitude of these benefits can be drawn from the existing data presented in this synthesis report. Implementation of the NEAP could achieve some of the following:

- Saving about 3000 lives per year by reducing particulate matter and SO₂ levels to WHO standards;
- Reducing total health costs by \$125 million each year by the same measures;
- Saving 1.5 billion m³ of drinking water per year if losses in the public distribution networks can be cut in half;
- Recapturing some of the one billion tons of soil and 87 million tons of plant nutrients lost each year due to erosion;
- Extending the economic life of dams and hydropower plants by reducing sedimentation;
- Saving some of the 6.7 million tons of illegally harvested wood each year by substituting fuels and increasing efficiency;
- Preserving some of the 17 species of fauna and 46 species of flora that are under threat of extinction;
- Saving some of the 1000 lives and 1% of GNP lost on average each year due to natural disasters; and
- Improving the quality of life for some of the 20 million Turkish citizens who live in illegal urban settlements.

4.14 These and other benefits should be further developed along with more detailed costs of the proposed NEAP actions so that either cost-benefit or cost-effectiveness analysis can be used to guide NEAP implementation.

C. Implementation Strategy

4.15 Turkey has prepared its NEAP later than many other countries. In one sense, this is fortunate because it can benefit from implementation experience elsewhere. A recent review of NEAP experience (World Bank, 1995) suggests several factors are important for effectively implementing action plans. These factors include: integrating environmental objectives with broader development goals; involving key stakeholders; improving institutional performance; monitoring and evaluation; and mobilizing financial resources. Integrating the environment into development planning is one of the main components of the NEAP. The use of democratic and participatory mechanisms is one of the NEAP's key principles. Enhancing the existing system of environmental management is the NEAP's priority action program. Proposals for monitoring and evaluation are presented in paragraphs 4.22 - 4.26. Options for mobilizing financial resources are presented below in paragraphs 4.29 - 4.31.

4.16 International experience is helpful but certain local realities must also be addressed. Most important, in the planning system of Turkey, there is no tradition of preparing and implementing an *action plan* for a specific problem area. There has so far been no experience with action plans in spite of the abundance of other plans. There is also no mention of an *action plan* in key planning and environmental legislation. However, the SPO has the duty of "preparing development programs on sectoral or regional basis" And also prepares administrative action plans to monitor (but not enforce) achievement of development plan objectives. When the environment is taken as a sector, the NEAP should be regarded as a "development program of sectoral basis". When the NEAP is taken as a whole, it is a document for the implementation of a "national environment strategy" as laid down in the SFYDP. The proposed implementation strategy includes three phases: (i) initial implementation; (ii) monitoring and evaluation; and (iii) updating and revision.

4.17 **Lead Agency and Initial Implementation.** Elements of the NEAP, especially enhancement of the environmental management system as the top priority, require the coordination of more than one problem area, organization and legislative arrangement. At the same time, some of the NEAP principles may require significant changes in the operating procedures of individuals, organizations and agencies in the field of public administration. The SPO was established to "perform in an efficient, regular and swift way the economic, social and cultural planning services of the country so as to ensure efficient resource utilization and accelerate the pace of development." Hence, the SPO is endowed with important coordinating powers. In addition, the principles of the NEAP are parallel to the targets and principles of the SFYDP.

4.18 The first step towards formal adoption of the NEAP is to **achieve consensus on the synthesis document**. Once this report has been finalized, it should be formally reviewed and approved by the two central agencies involved in the preparation process – the SPO and the Ministry of Environment. Then, copies of the final NEAP should be distributed to relevant ministries, members of the Grand National Assembly, municipalities, NGOs, and the media; in addition, the key elements of the NEAP should be placed on the Web pages of the Ministry of Environment and SPO.

4.19 The second step is **integration of the NEAP actions in the annual programs prepared by the SPO**. According to Article 28 of Decree no. 540, the annual programs are prepared by the Undersecretariat of the SPO and presented to the Higher Council for Planning (HCP); and then to the Council of Ministers by the HCP. These programs become definite when approved by the Council of Ministers. Thus, the key actions identified in the NEAP should be included in the annual program.

4.20 The third step in the process of adoption is the **inclusion of NEAP actions in the programs of relevant agencies and organizations**. The SPO's duty at this stage is, according to Article 2/c of the relevant Act, to "ensure the coordination of the activities of ministries, government organizations and agencies related to economic, social and cultural policies; and to guide implementation in an efficient way" and, according to Article 2/f to "monitor, evaluate and coordinate the implementation of development plans and annual programs; and when necessary to make due modifications in such plans and programs." Article 29 of the same Act further consolidates this mission by assigning the SPO the duty of "ensuring the consistency and coordination of approved plans, annual programs and projects in the process of implementation."

4.21 Ultimately, adoption and implementation of the NEAP are dependent on the will of politicians and key administrators. They must perceive that it is in their interest as well as the public interest to make the necessary institutional, legal, budgetary, and other changes that are recommended in the NEAP. Political will is not generated by a report alone. It requires concerted public demand for improved environmental quality. This demand, in turn, is based on a certain level of awareness about the nature and importance of environmental problems in daily life.

4.22 **Monitoring and Evaluation.** For monitoring the NEAP, SPO and ME have different tools. HCE, which is affiliated with the ME, can be an appropriate institution for coordination and monitoring of activities under the NEAP. On the other hand, development plans, annual programs and allocation of funds could be an effective tool for monitoring by SPO. At the same time, other related ministries, local governments, and special government agencies can play a role in monitoring relevant components of the NEAP. However, such dispersal of authority may lead to conflicts in NEAP monitoring and evaluation, unnecessary or redundant supervision or failure to monitor under the assumption that another entity is undertaking the responsibility. To avoid these problems, monitoring should be the responsibility of one central actor. Therefore, this responsibility should rest with the ME, as the entity which has the mandate to coordinate initiatives and implementation of environmental activities of relevant ministries and other agencies.

4.23 Monitoring should be based on a set of indicators that report whether NEAP strategic objectives are being achieved. In addition, the indicators should be measurable, based on existing data, quickly observable, collected over a regular interval, widely accepted, easy to understand, comparable, and balanced between positive and negative impacts. A set of such indicators for monitoring the NEAP has been drafted and is included in Annex 8. These indicators will need to be regularly assembled, analyzed and disseminated if they are to be effective tools for monitoring NEAP implementation.

4.24 Some of the information needed to measure progress of the NEAP is already being collected, although not necessarily on a regular basis, by the State Institute of Statistics (SIS). SIS's capacity should be expanded and upgraded to collect the full set of indicators through necessary staff training, modification of procedures and acquisition of necessary equipment. In the long run, SIS could integrate environmental and human resource measures of wealth as an aggregate indicator of sustainable development. This will require cooperation from a range of stakeholders. Cooperation could be obtained in part by assuring that providers of information have complete and timely access to the full set of indicators.

4.25 Indicators are just one set of information that should be used to evaluate NEAP implementation. Other important sources will include: (a) mid- and end-of-project reviews for all NEAP-related programs and investments which would be the responsibility of the relevant implementing agency; (b) an overall NEAP performance review at the end of the fifth and tenth years; and (c) periodic Government reviews such as the preparation period for the Five Year Development Plans and meetings of the Environment Council. Regular and formal evaluations could then be conducted using these sources by the Ministry of Environment and State Planning Organization to determine whether progress was being made in NEAP implementation.

4.26 To enhance information dissemination and public awareness, the following steps are recommended:

- regular publication and distribution of the NEAP indicators;
- preparation of an annual “State of the Environment” report based on analysis of the indicators as well as specialized information (reports, project feedback, studies) that becomes available during the year;
- creation of a Web site for citizens and others to access the latest, as well as past, versions of the indicators and “State of the Environment” report; and
- periodical stakeholder review of the indicators and monitoring process to assess their relevance and effectiveness.

These actions would generate useful public feedback that could also help improve the performance of NEAP implementation.

4.27 Updating and Revision. The SPO is formally responsible for monitoring and coordinating the implementation of development plans and annual programs, and introducing modifications to annual programs when necessary. Based on this, the SPO should have the lead responsibility for modification and revision of the NEAP should also be seen as the duty of the SPO. Updating and revising the NEAP should take place at the stage where development plans and annual programs are prepared and in a way to supply inputs to the preparation of these documents.

4.28 However, activities for environmental protection and management require wide participation, consensus and democratic mechanisms. It may be difficult to meet these requirements by relying on administrative procedures. Thus, a mechanism for stakeholder participation in updating and revising the NEAP should be institutionalized. This will require that the mechanism be formed and its functions, participants, nature of their participation, term and duration of work, and principles of decision making be specified by a Regulation. The same Regulation should clarify the method and format for modifying the NEAP.

4.29 Possible Sources of Finance. The financing strategy for the NEAP can be based on the following sources:

- **Governmental resources** - mobilizing existing and generating new revenues from central government, local government resources, charges on publicly-provided services, other environmental fees and environmental taxes;
- **Private sector support** - e.g. financing by industries of their own pollution expenditures, and public-private partnerships to finance environmental infrastructure and services; and
- **International financing** - borrowing foreign exchange from overseas banks, credits and grants from bilateral donors and international NGOs, and grants and loans from international development agencies.

4.30 The financing resource or combination of resources that is actually used to fund projects within the NEAP will depend upon: the magnitude of the investment; the extent to which the investment is in line with existing government budgetary priorities; the

willingness of the private sector to participate in NEAP implementation; the power of the Government to encourage private sector involvement; the level of interest of bilateral and international donors in particular NEAP projects; and the macro-economic status of the Turkish economy.

4.31 To "market-test" the NEAP and mobilize financial resources, a **NEAP Implementation Conference** should be held. The purpose of the conference would be to formally present the NEAP to relevant parties help its implementation. Participants would include decision-makers from: relevant sections of the SPO; government ministries identified as implementing agencies of projects; unions of municipalities; the Grand National Assembly who oversee the planning and budgeting process; chambers of industry, agricultural and other parts of the private sector; bilateral donors; international NGOs; and international development agencies, including the World Bank which largely financed preparation of the NEAP.

REFERENCES

- ALPKENT, Nurettin (1992); Bitkisel Üretim Artırlarında Maliyetler ve Verimlilik, MPM, Ankara ("Costs and Efficiency in Crop Yield Increases")
- ANONYMOUS 1997 (Ministry of Forestry/World Bank); Biodiversity Assessment, Strategy and Action Plan - Turkey, May 3, 1997 draft, Ankara
- ATAY, Dođan 1990; "Karadeniz Bölgesi Balıkçılığının Genel Durumu, Sorunları ve Verimliliği Artırma Tedbirleri", Dođu Karadeniz Bölgesinde Tarımsal Üretim Verimlilik Sorunları Sempozyumu, MPM, Ankara ("Overall Situation and Problems of Fishing in Black Sea Region and Measures for Raising Efficiency")
- EFT 1995: Environmental Profile of Turkey, Ankara
- ERAÇ, Ahmet ve ark. 1995; "Çayırlar ve Meraların Koruma ve Kullanımı", Tarım Haftası'95, Türkiye Ziraat Mühendisliği IV. Teknik Kongresi, TMMOB, Ziraat Mühendisleri Odası, Ankara ("Preservation and Utilisation of Pastures and Ranges")
- GAP 1993; GAP Bölgesi Tarımsal Girdi İhtiyaçları, GAP İdaresi, Ankara ("Agricultural Input Needs in the GAP Region")
- GAP/UNDP 1995; Sustainable Development Programme in the Southeastern Anatolia Project Region in Turkey, Programme Support Document, Ankara
- GER, Metin and ATAMAN Nurhan, 1996a; National Environmental Action Plan Study Report, August 1996, Ankara
- GER, Metin and ATAMAN Nurhan, 1996b; National Environmental Action Plan Ranking Conference Report, December 1996, Ankara

- GÜVENDÝK, G. and N. TORKAMANI 1994; The relationship between blood lead levels and blood pressure of adults living in Ankara, J. Fac. Pharm. Gaz.
- ICLEI (INTERNATIONAL COUNCIL FOR LOCAL ENVIRONMENTAL INITIATIVES) 1997; Local Agenda 21 Survey, Toronto
- ILLER BANK 1997; 1996 Annual Report, Ankara
- KADIOĐLU, Sedat-TELLÝOĐLU, Zarife, 1996; "Enerji Kaynaklarýnýn Kullanylý ve Çevreye Etkileri", Türkiye Enerji Sempozyumu'96, TMMOB, Elektrik Mühendisleri Odası, Ankara ("Use of Energy Sources and its Effects on the Environment")
- KAYA, Zeki ve ark. 1996; Türkiye Bitki Gen Kaynaklarýnýn Yerinde Korunması Ulusal Planý (Yayýnlanmamýþ), Ankara ("National Plan for the in situ Protection of Plant Gene Sources in Turkey" /unpublished)
- KURÝ, Kenan 1995; "Karadeniz'e Türkiye Üzerinden Açýlan Akarsularýn Taþýdýđý Kirlilikler", Karadeniz'in Kirlenmesi ve Korunması Kongresi Bildirileri, Kýrsal Çevre ve Ormançýlýk Sorunlarý Araþtırma Derneđi ("Pollutants Carried by Streams Flowing to Black Sea Over Turkey")
- LEONARD, H. Jeffrey et al. 1988; Environment and the Poor: Development Strategies for a Common Agenda, Transaction Books, New Brunswick (USA) and Oxford (UK)
- MEGA-CITIES 1994; Environmental Justice: Environment-Poverty Intersection, UNDP
- MENR (Ministry of Energy and Natural Resource) 1997; 1970-1996 Energy Balances (Communication to SPO), July 1997
- METAP, World Bank & Ministry of Environment 1995; Study on Appropriate Solid Waste Management Practices (prepared by Environmental Resources Management and Tugal Çevre Teknologisi), Final Report
- MINISTRY OF ENVIRONMENT 1993; Türkiye'de Turizm ve Enerji Sektörlerinde Sürdürülebilir Çevre Politikalarına Ýliþkin Tartýþma Raporu, Turizm ve Çevre, Ýkinci Kitap, Türk Sosyal Bilimler Derneđi, Antalya ("A Discussion Report on the Sustainable Environment Policies in the Sectors of Tourism and Energy in Turkey: Tourism and Environment)
- MINISTRY OF ENVIRONMENT 1994; I. Çevre Đurasý Sonuç Raporu (18-21 Eylül 1991), Ankara ("The Final Report of the First Environment Council Meeting" by the Ministry of Environment (ME))
- MINISTRY OF ENVIRONMENT 1995; II. Çevre Đurasý Sonuç Raporu, Ankara ("The Final Report of the Second Environment Council Meeting")
- MINISTRY OF ENVIRONMENT 1997; Formal Communication of Data to SPO, May 1997

- MOSER, Caroline 1996; *Confronting Crisis: A Comparative Study of Household Responses to Poverty and Vulnerability in Four Poor Urban Communities*, The World Bank, Washington, DC
- OECD 1992; *Environmental Policies in Turkey*, Paris
- OECD 1994; *Environmental Indicators*, Paris
- OECD 1994; *Reducing Environmental Pollution: Looking Back, Thinking Ahead*, Paris
- OECD 1996; *Environmental Performance in OECD Countries: Progress in the 1990s*, Paris
- ÖNEN S. Mustafa 1995; "Çevre Mevzuatı ve Kamu Yöneticileri: Bir Araştırmanın Bulguları", *Amme İdaresi Dergisi*, Cilt 28, Sayı 4, Aralık 1995, Ankara
- ÖZSUCA, Perife Turcan 1996; "Türkiye'de Sanayileşmenin Yapısı: Bölgesel Analiz 1987-1994", *İktisat, İşletme ve Finans*, Aralık ("Structure of Industrialisation in Turkey: Regional Analysis")
- SIS (STATE INSTITUTE OF STATISTICS) 1994; *Environmental Statistics: Municipal Solid Waste Statistics (1991)*, Ankara
- SIS 1995; *The Population of Turkey, 1923-1994, Demographic Structure and Development*, Ankara.
- SIS 1996a; *Environmental Statistics: Manufacturing Industry Waste Statistics (1992)*, Ankara
- SIS 1996b, *Fisheries Statistics*, Ankara
- SIS 1997; *Statistical Yearbook of Turkey*, Ankara
- SPO (STATE PLANNING ORGANIZATION) 1995/a; *Seventh Five Year Development Plan (1996-2000)*, Ankara
- SPO 1995/b; *Yıllar İtibariyle Çeşitli Göstergeler, Bölgesel Gelişme ve Yapısal Uyum Genel Müdürlüğü*, Ankara
- SPO 1997; *Economic and Social Indicators, (1950-1997)*, Ankara.
- TALYM, Metin 1995; "Ulusal Ekonomide Tarımın Yeri ve Önemi", *Tarım Haftası'95, Türkiye Ziraat Mühendisliği IV. Teknik Kongresi, TMMOB, Ziraat Mühendisleri Odası*, Ankara ("Place and Importance of Agriculture in National Economy")
- TEKYNEL, Osman 1993; "ÇED Yönünden Aşağı Seyhan Ovası Sulaması Sorunları ve Çözüm Önerileri", *GAP ve Çevre, Türkiye Çevre Vakfı*, Ankara ("Problems in the Irrigation of Lower Seyhan Plain in terms of EIA and Suggestions for Solution")
- TEKYNEL, Osman ve ark. 1995; "Tarımsal Su Kaynaklarının Geliştirilmesi", *Tarım Haftası'95 Türkiye Ziraat Mühendisliği IV. Teknik Kongresi, TMMOB, Ziraat Mühendisleri Odası*, Ankara ("Development of Agricultural Water Resources")

TÇV, 1995; Türkiye'nin Çevre Sorunları, Ankara ("Environmental Problems of Turkey")

TMMOB 1997; Çevre '97 Sektör Kataloğu ("Environment '97 Sector Catalogue")

TOPRAKSU 1978; Türkiye Arazi Varlığı, Toprak Etüdüleri ve Haritalama Dairesi Başkanlığı, Ankara ("Land Endowment of Turkey")

TUSIAD 1996; Local Government in Turkey: Problems and Solutions (Executive Summary), TUSIAD Publication No. T/96,5/198, İstanbul

UĐUR, Aydın 1996; "STK'lara Eleştiri Merceğiyle Bakılınca", Sivil Forum

ÜLKER, Ýsmet 1992; Dağ Turizmi, Planlama Yöntemleri, Yüksek Dağlarımız ve Kayak Merkezleri ("Methods of Planning for Mountain Tourism, High Mountains and Ski Resorts of Turkey")

USAID 1990; Ranking Environmental Health Risks in Bangkok, Thailand, Office of Housing and Urban Programs, Washington, DC

USAID 1995; Ranking Risks in Cairo: Air Pollution Poses Worst Environmental Threat, PRIDE publication, Washington, DC

WORKING GROUP (WG)/1 1996; "Report by the NEAP Sub-group on the Management of Marine Resources and Pollution Control", Ankara (in Turkish)

WG/2; 1996; "Report by the NEAP Sub-group on Water Resources Management" (in Turkish)

WG/3 1996; NEAP "Population and the Environment" (in-Turkish)

WG/4 1995; NEAP Sub-group on "Agricultural Technologies"

WG/5 1995; "Report by the NEAP Sub-group on Agricultural and Range Lands" (in-Turkish)

WG/6 1996; NEAP, Energy and the Environment

WG/7 1996; "Report by the NEAP Sub-group on the Preservation of Natural, Historical and Cultural Assets" (in-Turkish)

WG/8 (1996); "Report by the NEAP Sub-group on Land Use and Coastal Zone Management" (in-Turkish)

WG/9 1995; NEAP Sub-group on "Forest Resources Management"

WG/10 1995; "Report by the NEAP Sub-group on Education and Participation" (in-Turkish)

WG/11 1996; NEAP, Protection of the Air Quality

WG/12 1996; "Report by the NEAP Sub-group on the Air Pollution Due to Industry" (in-Turkish)

- WG/13 (1996); "Report by the NEAP Sub-group on Legal and Regulatory Framework" (in-Turkish)
- WG/14 1995; Report by the NEAP Sub-group on "Hazardous Waste Management"
- WG/15 1995; "Report by the NEAP Sub-group on Solid and Medical Waste Management" (in-Turkish)
- WG/16 1996; Report by the NEAP Sub-group on, Wastewater Management
- WG/17 1996; "Report by the NEAP Sub-group on the Noise Pollution" (in-Turkish)
- WG/18 (1996); "Report by the NEAP Sub-group on Health and Environment" (in-Turkish)
- WG/19 (1996); "Report by the NEAP Sub-group on Economic and Financial Issues" (in-Turkish)
- WORLD BANK 1995; National Environmental Strategies: Learning from Experience, Environment Department, Washington, DC
- WORLD BANK 1997a; Turkey Country Assistance Strategy, Ankara
- WORLD BANK 1997b; World Development Indicators, Washington, DC
- YÜCEL Asuman, SARITAP Canan, ÇULFAZ Aydın, Kentler ve Diđer Yerleşme Göçyolları Nüfus Tahmini, Yedinci Beş Yıllık Kalkınma Planı, SPO, 1994.
- ZAIM, Katalin 1997; Estimation of Health and Economic Benefits of Air Pollution Abatement for Turkey in 1990 and 1993, *Energy Policy* (forthcoming)
- ZAIM, Katalin 1997; Modified Gross Domestic Product Through Environmental Input-Output Table: The Case of Turkey, 1990, Bilkent University, Ankara

ANNEX 1

Stakeholder Participation Process

The purpose of the stakeholder participation process was to seek inputs from a wide range of actors on the goals, criteria and priorities for the NEAP. This was accomplished through two stages of linked participatory meetings held during 1996. A technique known as the Analytical Hierarchical Process was used during most meetings to organize and analyze stakeholder perspectives.

The participatory process was guided by an Executive Committee consisting of representatives from the SPO, the Ministry of Environment and the World Bank (Resident Mission). Organizational issues and logistics were handled by a Steering Committee made up of the Executive Committee plus representatives of stakeholder groups. Detailed information on the two stages and their outputs follows. The stakeholder participation process, its linkage to the working group process and relevant dates are summarized in a flow chart presented in Figure A1.1.

Stage 1: Determining Broad Goals, Implementation Areas and Basic Activities

To initiate the NEAP preparatory process, it was first necessary to determine the broad goals and implementation areas

that could be form the framework for action. Then, basic activities (with prioritized action sets) within these goals and implementation areas were determined. participatory techniques were employed in this process. This was done in Stage 1 through limited search, ranking and decision conferences. Using democratic discussion, consensus was reached on i) goals and underlying factors; ii) implementation areas and basic activities; iii) action sets and their rankings.

Broad Goals and Their Underlying Factors.

A limited search conference was used to identify broad goals for the prevention and elimination of environmental problems and their underlying factors. The meanings attributed to specific proposals for action were also clarified. The first output of the limited search conference was to identify and define broad goals of the NEAP. These broad goals (quality of life, awareness, management, and development) and their definitions were given in the main text (see Table 1.1).

Next, the basic factors that underlie these goals were identified by participants in the *limited search conference*. Table A1.1 sets out the basic factors that make up each of the four broad goals.

Figure A1.1: Flow Chart of NEAP Preparation Process

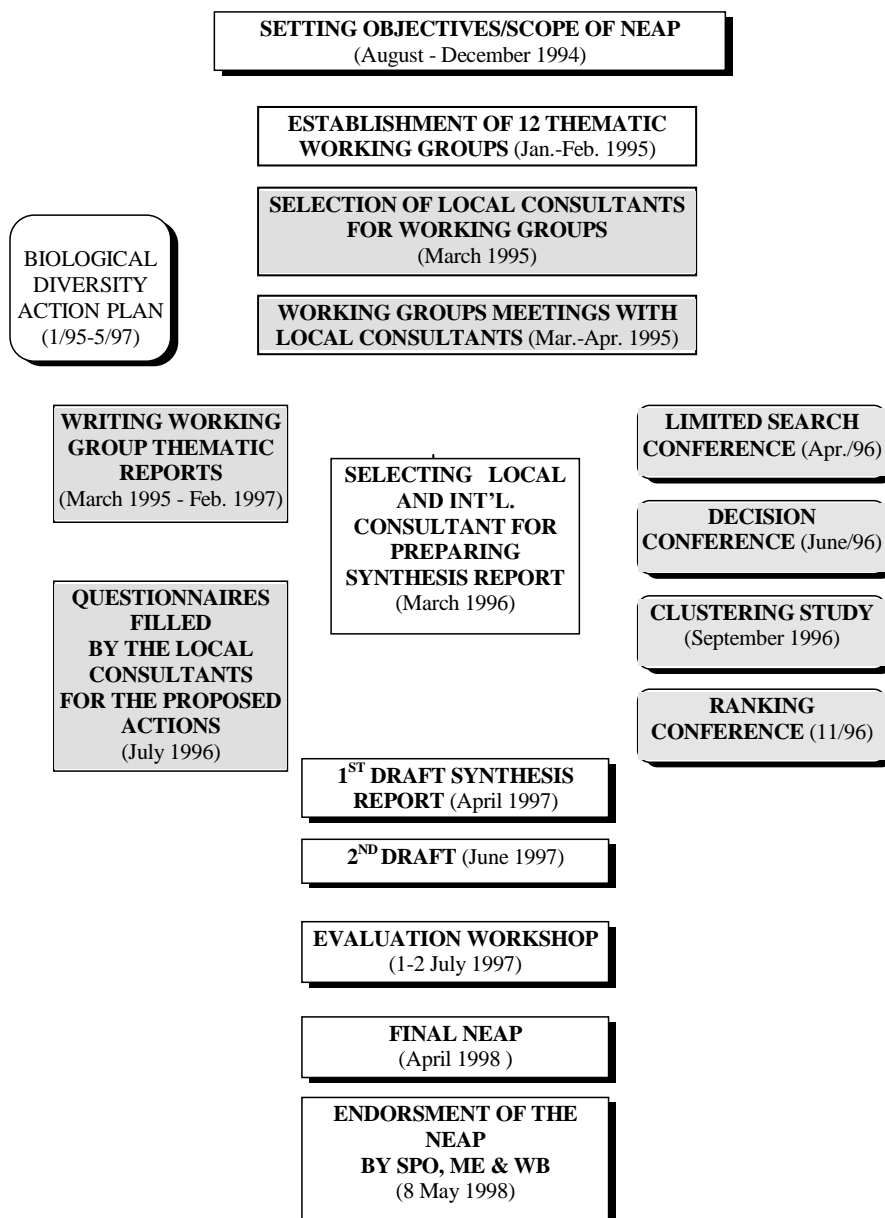


Table A1.1: Basic Factors Forming the Goals

QUALITY OF LIFE	AWARENESS
Health Living Environment Consumption Social Welfare	Ethics Education and Training Social Consensus
MANAGEMENT	DEVELOPMENT
Financing Information Institutional Structure Legal Structure	Sustainability International Interaction Planning R & D and Technology

Areas of Implementation and Basic Activities. Next, participants in the limited search conference identified key *areas of implementation* for the NEAP. They began by listing a total of 34 **basic activities** that could be conducted within the NEAP. Then, 6 **implementation areas** were identified to group these activities. Basic activities and implementation areas thus determined are given below in Table A1.2.

Prioritization of Goals and Underlying Factors. Prioritization of goals and their underlying factors was done in the *ranking conference*. During this process, two indicators, *reference* and *dependency*, were used. "Reference" is the extent to which a broad goal or underlying factor is a precondition for achieving another broad goal or underlying factor. "Dependency" is the extent to which a broad goal or underlying factor occurs simultaneously with another broad goal or basic factor. After discussions and analyses, *reference* and *dependency* rankings of four goals with respect to each other were determined by participants in the ranking conference.

The first outcome of the meeting was that the four goals were considered almost equally important. According to the results of the *reference* ranking, the "management"

goal was considered most necessary for achieving the other goals. On the other hand, the "quality of life" goal was found to be the least needed as a pre-condition for the realization of other goals. To put it another way, elements of the "quality of life" could exist only after elements of other goals are realized. According to the results of the *dependency* ranking, "development" is the goal whose attainment is most dependent upon the realization of the other goals. On the other hand, "awareness" is the goal whose realization is least dependent on the attainment of other goals.

The second outcome of the ranking conference was to make reference and dependency rankings of the factors that underlie the broad goals. In the ranking of basic factors, it was also observed that relative values were quite close to each other. Examining the results more closely, the following can be observed:

- according to the results of *reference* ranking, "information" and "financing" are the most important basic factors for the realization of actions in the NEAP. On the other hand, "ethics" and "consumption" are the basic factors least needed for the same.

- In *dependency* ranking, actions which can be related to "sustainability" and "R & D and technology" are those which are relatively more important for realization of the NEAP.

Table A1.2: Implementation Areas and Basic Activities

Implementation Areas	Basic Activities
Economy	<ul style="list-style-type: none"> o Incentives and Supports o Coordination and Efficiency of Financial Resources o New Financial Resources o Incorporation of the Environment in Economic Decision-making
Information	<ul style="list-style-type: none"> o Inventory (Data Collection and Dissemination) o Identification of Eco-basins o Updating of Maps and Cadastry o Monitoring o Conceptual Consistency
Administrative Practices	<ul style="list-style-type: none"> o Efficiency and Thrift o Waste Management o Standardization o Total Quality and Risk Management o Crisis Management o Diffusion and Efficacy of the EIA
Awareness Building	<ul style="list-style-type: none"> o Formal and Non-formal Education o Vocational Training o Mass Media o Sensitization of political power o Religion o Change in Consumption patterns
Institutionalization	<ul style="list-style-type: none"> o Making NGOs and professional Organizations More Influential o New Forms of Cooperation o Effective Working of the public and private Sectors o Encouragement of Local Governance o Improvement, Harmonization and Simplification of Legislation o Compliance with International Obligations
Resource planning	<ul style="list-style-type: none"> o Energy planning o Resources Management o population and population Movements o Special problem Areas o Social, Economic and Spatial planning

According to the results of the ranking conference, "awareness" should be, in relative terms, the most important goal of the NEAP. In other words, the NEAP can be implemented only in a conscious society. "Education and training" is the most important underlying factor for carrying out the NEAP.

Ranking Implementation Areas and Basic Activities. Ranking of the areas of implementation and basic activities were also made in a *decision conference*. To do so, groups were formed to evaluate each goal separately and rank the **areas of implementation**.

The priority areas for implementation selected by the decision conference were "awareness building" and "institutionalization". Combining these two, the conference emphasized the need for an institutional structure that is "fed by an awareness formed as a result of adequate and accurate information where the concern for the protection of the environment is internalized in all activities, especially in vocational training, cultural and political attitudes, and behavior; and where this awareness lays the ground for the activation of all public organizations including professional organizations and local governments, for the relevance and complementarity of legislative arrangements, and for the observation of mutual rights and obligations in the international arena." Actions under the heading "economy" ranked

lowest. These were defined as: "the setting where the costs of environmental protection and the solution of environmental problems are regarded as a decision variable in the determination of economic policies; and where potential resources are mobilized while various schemes of incentive and support are employed."

The decision conference next ranked the importance of **basic activities**. Analysis of the ranking results showed that the 34 basic activities displayed a distribution which can be grouped according to threshold values at four points. These groupings were labeled according to the basic activities they embodied and are listed in Table A1.3 together with their places in the ranking (GER, M. and ATAMAN, N. 1996a).

Table A1.3: Activity Groups and Prioritized Activities They Cover

<i>Sets of Activity</i>	<i>Basic Activities</i>
Formation of Local Networks	1) Encouragement of Governance at the Local Level, 2) Mass Communication
Organization	3) Establishment of New Forms of Cooperation, 4) Sensitization of political power, 5) Total Quality Management, 6) Formal and Non Formal Education
Formation of a New Fabric	7) Resource Management, 8) Improvement, Harmonization and Simplification of Legislation, 9) Identification of Eco-basins, 10) Spread of EIA, 11) Alteration of Consumption patterns, 12) Making NGOs and professional Organizations More Effective, 13) Monitoring, 14) Conceptual Consistency, 15) Risk Management, 16) Crisis Management, 17) Making public and private Organization More Effective, 18) Spread of R & D, 19) Compliance with International Obligations, 20) Standardization
Mechanisms	21) Vocational Training, 22) Inventory, 23) Data Collection, 24) Extension, 25) Map Updating and Cadastry, 26) Incorporation of the Environment in Economic Decisions, 27) population and population Dynamics, 28) Religion, 29) Efficiency and Thrift, 30) Waste Management
Financial Mechanisms	31) Coordination and Efficiency in the Utilization of Financial Resources, 32) New Sources of Finance, 33) Incentives and Support, 34) Energy Planning

The decision conference was the largest and most participatory of the three meetings held during Stage 1. The composition of stakeholders attending the decision

conference is presented in Table A1.4 according to their expertise and sectors of origin.

Table A1.4: Functional and Sectoral Composition of Participants in Decision Conference

FUNCTIONS	SECTORS			TOTAL
	PUBLIC	PRIVATE	NGOs	
Investment	6	4	2	12
Assessment, Monitoring and Evaluation	4		2	16
Training and RE-DE	4	3	4	11
Financing	5	2	1	8
Decision Making	6	2	2	10
TOTAL	25	11	11	47

Stage 2: Grouping and Prioritizing Actions from the Working Groups

While the first stage of the participatory process worked independently from the thematic working groups to set broad goals and implementation areas, the second stage consciously used the working group outputs in order to group and rank actions. This stage consisted of three phases: (1) organizing the thematic group outputs; (2) developing criteria; and (3) ranking action groups.

Organizing the Thematic Group Outputs. This phase was accomplished in two steps. In the first step, *proposals for action* included in the WG reports for each problem area were attributed to organizations which would be in charge of conducting these actions, organized according to the 34 *basic activities* that were identified in the *limited search conference*, and labeled as to whether they were short, medium or long- term actions. This work was done by the WG consultants on a form designed by the Executive Committee. A total of 1290 *action proposals* were identified. Each of these proposals fits the definition "works/operations/activities which are deemed necessary in order to attain a pre-determined goal, and which can be further clarified in terms of persons/agencies/organizations that are supposed to realize such works/operations/activities together with

explanations concerning where, when and how."

In the second step of the first phase, 1290 *action proposals* were grouped by a ranking technique. The grouping work was done by 19 persons, most of whom were from the Steering Committee. 47% of these persons were from the public sector (including universities), 32% from the private sector and 21% from non-governmental organizations such as foundations, associations and professional organizations. In the grouping work, 1290 *action proposals* were classified with respect to *basic activities* and presented to participants in 34 different sets. Then, participants were asked to group these *action proposals* by considering the action definition given above and excluding those which did not fit the definition and to assign common headings/titles to each of their groups by using their own criteria. At the end of a full day's work, the 1290 *action proposals* were listed under 150 *action groups*.

Determining Criteria. This second phase also had two steps. In the first step, **criteria** which were to be used to rank of the action groups were determined. These criteria and their are listed below in Table A1.5. While making these definitions, criteria used by other countries that had prepared national environment action plans were also considered in addition to the specific

circumstances of Turkey (GER, M. and ATAMAN, N.,1996b).

Table A1.5: Criteria Taken as Base in the Ranking of the Sets of Action

Criteria	Explanation
HUMAN HEALTH	Implications of improvements in environmental conditions on individuals and communities in terms of mental and physical characteristics; impact of such improvements on development in qualitative and quantitative terms.
ECOLOGICAL BALANCE	Implications of improvements in environmental conditions on the basic components of living environments and on the relationship of such components; impact of ecological cycle on the preservation and sustenance of natural processes.
CULTURAL, HISTORICAL, AESTHETIC ASSETS	Impact of improvements in environmental conditions on the identification, preservation and development of cultural, historical and aesthetic assets.
ECONOMIC PRODUCTIVITY	Implications of improvements in environmental conditions on resource utilization; impact of such improvements on the level of development

Meanwhile, the 34 activities which had been identified and ranked during Stage 1 were summarized in 5 activity sets. These activity sets are defined in Table A1.6.

Table A1.6: Activity Sets

Activity Sets	Explanation
FORMATION OF LOCAL NETWORKS	Refers to activities which are supported by the mass media to encourage government on-the-locale
ORGANISATION	Refers to the formation of new cooperation, sensitization of the political power, total quality management, and activities geared to formal and non-formal education.
FORMATION OF A NEW STRUCTURE	Refers to the following: Resource management; improvement, harmonization and simplification of legislation; identification of ecological basins; wider adoption of EIA; change in consumption patterns; enhancing the effectiveness of NGOs and professional organizations; improvements in monitoring, conceptual consistency, risk-crisis management, organizational structures of both public and private organizations; wider adoption of RE-DE; compliance with international obligations and improvement in standardization.
MECHANISMS	Refers to activities in relation to vocational training; updating of maps; cadastry works; inclusion of environment in economic decisions; population and population movements; religion; productivity; saving; waste management and others covering special problem areas.
FINANCING MECHANISMS	Refers to activities in relation to the coordination and effectiveness of financial resources; incentives and subsidies; energy planning

Ranking the Action Groups. In this final phase, a ranking conference was held over two days to answer to the following question: Using the four criteria, how important is each

of the 150 action groups to achieve the activities embodied in the five activity sets?. During this conference, respondents were asked to assign number "3" to any *action group* that they considered *critical*, "2" to those considered *important*, "1" to those

considered somewhat *relevant*, and "0" to others that they found *irrelevant*. A sample of the form filled by respondents in this evaluation is given below in Figure A1.2 (GER, M. and ATAMAN, N.,1996b).

Figure A1.2: Matrix Filled in During the Attribution Work of Participants

ACTIVITY SET				
	Criteria			
Action Sets	Human Health	Ecological Balance	Cultural, Historical and Aesthetic Assets	Economic Productivity
S1 Action Group				
S2 Action Group				
...				
S19				

This ranking conference involved 45 persons: 53% from the public sector (including universities and municipalities); 25% from the private sector; and 22% from foundations, associations, professional organizations and other NGOs. In selecting the participants, a list specifying the focus of work of the decision conference and

respective organizations and status of individual participants was used. These stakeholders also determined the relative weights of each criterion. These values were later incorporated to rank the action groups. Relative weights of the previously determined criteria are given in Table A1.8.

Table A1.8: Relative Weights of Criteria Used to Rank Action Groups

Criteria	Relative Weight
Human Health	0.315
Ecological Balance	0.323
Cultural, Historical, Aesthetic Assets	0.200
Economic Productivity	0.161

The result of all this work was a ranked list of 150 action groups. The

prioritized list of action groups is presented in Table A1.9.

Table A1.9: Prioritized Action Groups

No.	Action Group
-----	--------------

1	Development and efficient operation of reliable, renewable environmental information production systems that are terminologically and conceptually consistent
2	Implementation of training programs for building awareness among stakeholder groups (e.g. women, youth, farmers, industrialists, trade unions, armed forces)
3	Formation and use of an active communication network
4	Development and use of participatory mechanisms in planning and implementation
5	Effective pollution measurements
6	Ensuring the participation of NGOs and people in environmental protection activities
7	Development of population policies by taking into account the population-resources balance
8	Preparation of local environment action plans
9	Creation of new and supplementary financial resources in central and peripheral organizations; enhancement and efficient use of existing ones
10	Influencing the population movements
11	Effective participation of stakeholders in decision making-processes of various levels
12	Enhancement of environmental health awareness and environmental concerns
13	Formation of quality control and inspection mechanisms in the production of goods and services
14	Preparation of management plans for coastal areas and seas
15	Development and implementation of effective waste management models for preventing pollution
16	Formation of a national environment information system (data base, inventory, information exchange)
17	Preparation of land use plans with special reference to environmental protection and pollution prevention
18	Regular and effective data collection, monitoring and evaluation, especially in hot spots
19	Development of cooperation between public organizations and the private sector and other organizations
20	Development of the mechanisms to address natural and human environmental risks
21	Harmonization of legal arrangements on public works and land use with the environment
22	Development of international cooperation on environment related issues
23	Following international developments related to the environment
24	Formation of risk management
25	Enhancement of financial resources to facilitate the organizational development of NGOs and cooperatives in the implementation of environmental policies
26	Incorporating the concept of eco-basin in regional environmental management plans and support with pilot projects
27	Increasing efficiency in resource management and utilization
28	Development of integrated (physical, social, aesthetic, etc.), dynamic and participatory planning, implementation and inspection mechanisms based on eco-basins
29	Identification of the regions of special importance with respect to environmental problems and preparation of action plans to be implemented in these regions
30	Orientation of domestic and external sources of finance to investments for environmental protection and improvement
31	Encouragement of technologies and projects that prevent environmental pollution, protect natural resources, and save energy
32	Development of inventory work related to air pollution
33	Development, implementation, and encouragement of techniques and technologies that prevent pollution at the source
34	Building local government capacity for environmental planning and management
35	Planning, implementation, monitoring and evaluation based on an inventory of sensitive species, regions, and ecosystems
36	More widespread use of clean energy sources
37	Establishment of Regional Administrations for the Management of Hazardous Wastes
38	Development of public-private sector cooperation in environmental planning and management
39	Introduction of appropriate legal, technical and administrative measures to minimize and eliminate solid wastes, especially by recycling
40	Effective inspection of constructions and settlements in touristic areas
41	Increasing the contribution of universities in environment related works
42	Development of new financial resources for the prevention of environmental pollution and protection of natural resources
43	Identification of measures and technological solutions for the elimination and mitigation of environmental pollution
44	Establishment and working of monitoring and inspection systems related to wastes that cause environmental pollution

45	More effective solid waste management
46	More efficient resource utilization by production planning
47	Additional legislative arrangements other than the Environment Act
48	Institutionalization of regional organizations for the management of marine resources
49	Introduction of measures for the prevention of the production of hazardous wastes at the source
50	Rearrangement of the school curricula in formal education to facilitate understanding of the modern tools of environmental management
51	Making the EIA process more effective
52	Introduction of legal arrangements and implementation of training programs for the prevention of environmental pollution
53	Making and implementing plans that are based on ecological balance at eco-basin level.
54	Formulation of water catchment areas in administrative and physical terms
55	Development of a model for environmental organization and legal arrangements related to this model
56	Diffusion of attitudes, behavior and practices for the protection of receiving environments
57	Utilization of economic measures for the implementation of environmental policies
58	Local and central arrangements for waste management
59	Activation of the private sector for the protection and development of the environment
60	Establishment of new institutions for environmental protection
61	Strengthening the existing institutional structure related to the environment and ensuring coordination among relevant organizations
62	Revision of the Regulation for EIA
63	Organization of natural resources management in an efficient and rational manner
64	Training those employed in various fields on environment related issues by using extension education and in-service training
65	Collection and standardization of emission and pollution data, formation of pollution maps
66	Development and use of methods of protection from noise, air pollution etc. that originate from the techniques used by people employed in the process of production
67	Development and implementation of land use policies through modern planning techniques
68	Formation and institutionalization of a data base in regard to this
69	Improvement of the data base that is used for EIAs
70	Restructuring of forestry management in a way that ensures the efficient and multi-purpose utilization of resources and to contribute to rural development
71	Development of environmental standards
72	Development and wider use of environmentally sensitive techniques and technologies for specific problems, regions and products
73	Introduction of new arrangements at the regional level to institutionalize environmental protection concerns and activities
74	Improvement of administrative arrangements related to environmental protection
75	Restructuring of land use patterns so as to protect environmental assets
76	Use of modern techniques in environmental management
77	Development of environment-friendly technologies and support for their use in production
78	Renovation of the Environment Act
79	Making water resources management more efficient
80	Development of demographic and social policies for environmental protection
81	Formation, updating and effective utilization of the instruments of natural resources management
82	Support for quality control schemes in both public and private sectors
83	Encouragement of technologies, techniques and processing methods compatible with environmental concerns
84	International cooperation in environmental training and participation in relevant international organizations
85	Enhancing managerial efficiency in forestry enterprises
86	Introduction of legal, institutional, administrative and financial arrangements to minimize the environmental harms of agricultural pesticides and fertilizers
87	Updating all regulations related directly or indirectly to environmental protection and development and filling gaps existing in this field
88	Rapid and effective introduction of economic, legal, financial, and administrative instruments and investment models to ensure the adequate functioning of the "polluter pays principle"
89	Protection of seas and inland waters
90	Harmonization of energy production and consumption policies with environmental protection requirements
91	Renewal of legislative arrangements related to environmental protection and management, including international agreements
92	Redefinition of the scope of EIA

93	Integration of environmental protection activities in agriculture
94	Development and use of effective tools and instruments in formal/non-formal education and in in-service training
95	Development of new organization models in environmental management
96	Introduction of institutional and technical arrangements for reducing costs and increasing efficiency in environmental protection activities
97	Identification of new natural parks
98	Ensuring standardization in the collection of environment related data
99	Establishment of "observer" organizations locally and/or on project basis
100	Strengthening the Ministry of Environment
101	Further development of work on the management of hazardous wastes
102	Making the EIA system more effective and renewal of relevant legislative arrangements
103	Introduction of necessary measures for the protection and development of water resources
104	Opening of new protected beach zones
105	Harmonization of energy and environment policies
106	Preparation of management and action plans for areas that need special protection because of their natural, historical, archaeological and aesthetic characteristics
107	Renewal of legislative arrangements for soil conservation
108	Making environmental education and training more effective by introducing new institutional structures in formal and non-formal education
109	Elimination of radioactive wastes without any damage to the environment
110	Introduction of legislative and technical arrangements for soil conservation
111	Filling gaps in the Regulation on Hazardous Wastes
112	Introduction of arrangements for preventing the production of hazardous wastes
113	Development of geographical information systems for areas where such information is required
114	Research on natural resources and development of environment friendly technologies
115	Revision of legislative arrangements for the protection and development of forests and national parks
116	Conduct of training, awareness building and works to change consumption patterns and minimize their impact on the environment
117	Establishment of an Environmental protection Center
118	Integration of environment in national income accounts
119	Efficient utilization of financial resources allocated to support activities related to the protection and management of the environment
120	Introduction of energy efficiency measures
121	Legal, administrative and institutional measures for irrigated farming and irrigation practices with a view to environmental protection
122	Encouragement of thrift in consumption
123	Harmonization of environment-related legal arrangements between international law, the EU and Turkey
124	Development of new concepts in legal arrangements
125	Wider use of techniques that protect water/land resources and biological diversity and observe land capacity classifications in land based production (i.e. crop farming, animal breeding, forestry)
126	Development of infrastructure for improving animal breeding activities in harmony with environmental concerns
127	Development of legal arrangements for the protection of biological diversity
128	Restructuring forestry policies
129	Intensification of R & D activities
130	Extension of the practice of family planning
131	Updating the Air Quality Control Regulation
132	Building environmental awareness among religious officials
133	International monitoring of the production of pesticides
134	Planning for efficient energy use
135	Preparation and widespread use of a Glossary Environmental Terms and Concepts
136	Development of an organization for preventing noise pollution
137	Using religious education and training to raise environmental awareness
138	Development and effective use of incentives and disincentives for the prevention of noise pollution
139	Use of techniques and technologies that do not harm the environment while practicing religious rules (i.e. call to prayer, religious sacrifice of animals, etc.)
140	Sustainable management of game resources
141	Land use planning to prevent noise
142	Monitoring and using international work and studies on noise

143	Introduction of new legislation dealing with the problem of noise pollution
144	Protection of historical environments
145	Prevention of migration through energy policies
146	Updating of the Noise Control Regulation
147	Reconsideration of urban plans with a view to noise reduction
148	Introduction of measures to prevent noise
149	Increased use of noise measurement devices by officials in provinces
150	Reduction of air pollution

These action groups, especially the top 50, were used to develop the structure of the NEAP. The NEAP is divided into an action program and five project areas (improving the institutional and legal framework; integrating the environment into development planning; enhancing awareness and information; investing in environmental management; and cooling the hot spots). Table A1.10 lists the action groups ranked within the top 50 that underlie each component of the NEAP.

Table A1.10: Linkage Between Prioritized Action Groups & NEAP Structure

Component	Underlying Action Groups
1. Action Program	4, 6, 9, 11, 19, 23, 25, 38, 42
1a) Improving the Institutional & Legal Framework	4, 6, 21, 27, 41, 47
1b) Integrating the Environment into Development Planning	9, 13, 17, 26, 27, 28, 29, 34, 35, 46
2. Enhancing Awareness & Information	1, 2, 3, 12, 16, 18, 32, 44, 50
3. Investing in Environmental Management	5, 7, 8, 10, 14, 15, 20, 22, 24, 29, 30, 31, 33, 36, 37, 39, 40, 43, 45, 49

Note: Numbers refer to prioritized action groups in Table A1.9

ANNEX 2

International Environmental Commitments

Treaties and Conventions

<i>Date & Place</i>	<i>Agreement</i>	<i>Ratified</i>
1931	Convention on *Whale Hunting	1934
Roma,1949	Agreement on the Establishment of a General Fisheries Council for Mediterranean(as amended)	1954
Paris,1959	International Convention on the Protection of Birds	1967
Paris,1951	Convention for the Establishment of the European and Mediterranean Plant Protection Organization (as amended)	1965
Washington, 1959	The Antarctic Treaty	1995
Geneva,1960	Convention Concerning the Protection of Workers Against Ionizing Radiation	1969
Paris,1960	Convention on Third Party Liability in the Field of Nuclear Energy (as amended)	1968
Moscow,1963	Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water	1965
London, Moscow, Washington, 1967	Treaty on Principles Governing the Activities of States in the Exploration and Use of Outer Space Including the Moon and Other Celestial Bodies,	1968
Paris,1968	European Convention for the Protection of Animals During International Transport	1971
Ramsar,1971	Convention on Wetlands of International Importance Especially as Waterfowl Habitat	1994
London, Moscow, Washington, 1971	Treaty on the Prohibition of the Emplacement of Nuclear Weapons and Other Weapons of Mass Destruction on the Sea Bed and the Ocean Floor in the Subsoil thereof	1972

London, Moscow, Washington, 1972	Convention on the Prohibition of the Development, Production of Stockpiling of Bacteriological (Biological) and Toxin Weapons, and on Their Destruction	1975
Paris, 1972	Convention Concerning the Protection of the World Cultural and Natural Heritage	1983
Washington, 1973	Convention on International Trade in Endangered Species of Wild Fauna And Flora (CITES)	1996

*Turkey becomes a party to a convention or treaty once appropriate political and administrative approvals have been obtained and the decision is published in the Official Gazette. The year given for becoming a party to a particular convention is the year of publication in the Official Gazette.

Paris,1974	Agreement on an International Energy Program	1981
Barcelona, 1976	Convention for the Protection of Mediterranean Sea Against Pollution (Barcelona Convention)	1981
London,1978	Convention on Prevention of Pollution from Ships MARPOL(Annex III and IV not signed By Turkey)	1990
Athens,1980	Protocol for the Protection of the Mediterranean Sea Against Pollution from Land-based Sources	1983
Barcelona, 1976	Protocol Concerning Cooperation in Combating Pollution of the Mediterranean Sea by Oil and Other Harmful Substances in case of Emergency	1981
1995	Protocol Concerning Specially Protected Areas in the Mediterranean	1996
1996	İzmir Protocol on the Prevention of Pollution of the Mediterranean Sea by Transboundary Movements of Hazardous Wastes and Their Disposal	1996
Berne,1979	Convention on the Conservation of European Wildlife and Their Natural Habitats (Bern Convention)	1984
Geneva,1979	Convention on Long-range Transboundary Air Pollution	1983
Geneva,1984	Protocol to the 1979 Convention on Long-range Transboundary Air Pollution on Long-term Financing of the Co-operative Program for Monitoring and Evaluation of the Long-range Transmission of Air Pollutants in Europe(EMEP)	1985
Vienna,1985	Vienna Convention on the protection of the Ozone Layer	1990
Montreal, 1987	Montreal Protocol on Substances that Depleting the Ozone Layer	1990
Vienna,1986	Convention on Early Notification of a Nuclear Accident	1990
Río de Janerio,1992	Convention on Biological Diversity	1997
Basel, 1989	Basel Convention on the Control of Transboundary Movements Hazardous Wastes and Their Disposal	1994
Bucharest, 1992	Convention on the Protection of the Black Sea Against Pollution	1994
Bucharest, 1992	Protocol on the Protection of the Black Sea Marine Environment Against Pollution from Land Based Sources	1994
Bucharest, 1992	Protocol on Cooperation in Combating Pollution of the Black Sea Marine Environment by Oil and Other Harmful Substances in Emergency Situations	1994

Bucharest, 1992	Protocol on the Protection of the Black Sea Marine, Environment Against Pollution by Dumping	1994
Paris, 1994	Convention on Desertification	-

Declarations

- * Stockholm Declaration on Human Environment (1972)
- * Helsinki Declaration on European Security and Cooperation (1975,1980,1986,1988)
- * Genoa Declaration on Mediterranean Sea(1985)
- * UN/EC Flora Fauna and Living Environment Protection Declaration (1988)
- * European Environment a Health Charter(1989)
- * Atmospheric Pollution and Climate (Noordwijk)Declaration (1989)
- * Euro-Mediterranean Environment Charter(1990)
- * UN/EC Sustainable Development (Bergen)Declaration (1990)
- * Ozone (Montreal)Protocol (1990)
- * New European (Paris)Charter (1990)
- * UN/EC Espoo Ministerial Accord(1991)
- * OECD Environment and Development Ministerial Policy Accord (1991)
- * Rio Declaration on Environment and Development(1992)
- * Agenda 21 (1992)
- * Declaration on Forestry on Principles(1992)
- * OECD Environment Ministers Declaration (1992)
- * Cairo Declaration (1992)
- * Central Asia and Balkan Republic Environment Ministers Declaration(1994)
- * Sofia Ministerial Declaration (1995)
- * Barcelona Resolution (1995)
- * OECD Environment Ministers Declaration (1996)
- * OECD Environment Ministers Declaration (1998)

ANNEX 3 LEGISLATION AND CONSTRAINTS

Table 3.1: Potentials and Constraints Regarding the Problem of Air Pollution

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

<ul style="list-style-type: none"> • Act no 1593 on General Hygiene (Articles 268 and 275) • Act no. 1580 on Municipalities (Articles 15/19 and 18/2) • Act no. 3030 on the Administration of Greater City Municipalities • Urban Development Act no. 3194 • Act no. 5442 on Provincial Administrations • Act no. 2399 on Poisonous Gases and Banning of the Importation and Domestic Production of Such Gases • Regulation on the Training of Heating Operators in Private and Official Buildings, Manufacturing Enterprises and Industrial Plants, and on the Operation, Control and Maintenance of Heating Systems" • Environment Act no. 2872 (Articles 8, 9, 10, 11/1, 11/2, 11/3, 11/4, and 13) • Regulation on the Protection of Air Quality (RPAQ) • Environment Declaration by the Automotive Industry. 	<ul style="list-style-type: none"> • Ministry of Environment • Ministry of Energy and Natural Resources • State Institute of Statistics • General Directorate of Basic Health Services, Ministry of Health • General Directorate of State Highways • Greater City Municipalities • Governorships • TIS "Environmental Air" Standards of no. 4845, 4985, 4986, 9544, 9628, 9733, 9734, 9839, 10502, 10866 and 11176 • TIS "Work Place Air Standards" nos. 11176, and 11597 • TIS "Motor Vehicles Exhaust Gas Emission Standards" nos. 3996, 4236, 5648, 7353, 8741, 8742, 10623, 11365, 11366, and 11510 • Tax reductions by Tax, Financing Acts and the Act on Vehicle Taxes 	<ul style="list-style-type: none"> • Ambiguities and contrasts in the sharing of authority by relevant organizations lead to administrative chaos, • Practice of putting rules, monitoring and supervision by different organizations lowers the efficiency of work, • Insufficient materials-equipment endowment of the Ministry of Environment makes it difficult to conduct work in proper and sustained way, • There are problems in the practical implementation of the RPAQ since it is the translation of the German one not fit to the conditions of Turkey • The text and expression of the RPAQ creates problems for full and correct comprehension, • Standards brought by the RPAQ are more flexible than those adopted by the WHO and the countries of the European Union • Scope of implementation is narrow since the RPAQ introduces sanctions related to urban settlements and industrial environments., • The polluting activities of public organizations are not supervised adequately
--	---	--

Table 3.2: Potentials and Constraints in Relation to the Management of Water Resources

Legal Potentials	Institutional and Technical Potentials	Problems - Constraints
------------------	--	------------------------

<ul style="list-style-type: none"> • Village Act no. 442 (Articles 1, 6, and 13) • Act no. 831 on Waters (Articles 2, 7, and Annex 4) • Act no. 1580 on Municipalities (Article 19/4 A) • Act no.6200 on the Organization and Duties of the State Hydraulic Works (Articles 1 and 2/b) • Act no. 2560 on the Organization and Duties of the Water and Sewage Administration of Ýstanbul (Articles 1 and 2/a) • Agricultural Reform Act no. 3155 (Article 2/c) • Act no. 3202 on the Organization of the General Directorate of Rural Services (Article 2/d) • Government Decree no. 181 in Force of Law on the Organization and Duties of the Ministry of Health (Article 9/e) • Government Decree no. 443 in Force of Law on the Establishment and Duties of the Ministry of Environment • Act no. 167 and Regulation on Ground Water Resources • Act no. 1380 and Regulation on Water Products • General Hygiene act no. 1593 • Regulation on the Control of Water Pollution (RCWP) 	<ul style="list-style-type: none"> • Ministry of Environment • SPO • SIS • TIS • Commission on Nuclear Energy • Ministry of Energy and Natural Resources • Ministry of Industry and Technology • Ministry of Health • General Directorate of Mining Researches • Refik Saydam Institute of Hygiene • Turkish Petroleum Inc. • Ministry of Agriculture and Rural Services, General Directorate of Water Products • General Directorate of Forestry • General Directorate of Afforestation and Erosion Control • General Directorate of Rural Services • Ministry of Tourism • Ministry of Public Works and Settlement, General Directorate of State Hydraulic Works • Ministry of Agriculture and Rural Services, General Directorate of Conservation and Control • Electricity Surveys Administration • Bank of Provinces • Related Units of Local Governments 	<ul style="list-style-type: none"> • Sustainable management of water resources becomes almost impossible since different organizations carry out water management activities at different levels without taking water basins as a whole. • Qualitative criteria as to the quality of water resources are incapable of responding to existing needs • There are problems in transition to the stage of implementation because of the variety and in some cases inadequacy of discharge standards for the control of the origins wastewater. There is no satisfactory coordination among related organizations at regional and local levels. In the similar and supplementary services of investing agencies, coordination at project level can not be ensured. These shortcomings lead to the wasteful use of resources and damage the sustainability of measures. • The General Directorate of Soil and Water Works was closed, but yet there is no new unit to undertake its tasks. Especially, surveys and inventory works on soil-water relations have been left to chance. • There are uncertainties as to the management of irrigation facilities built by the General Directorate of Rural Services (GDRS)
--	---	---

Table 3.2. Potentials and Constraints in Relation to the Management of Water Resources

Legal Potentials	Institutional and Technical Potentials	Problems - Constraints
	<ul style="list-style-type: none"> • STRIT • Environmental Problems Study and Implementation Centers of Universities, • Voluntary Organizations • TIS, "Water Quality" standards 4461, 4516, 5423, 5807, and 7242 • TIS "Natural Water Resources" standards 7241, 7739, 8218, 8265, 8266, 8363, 8364, 8365, 8821, 8832, 9101, 9130, 9359, 9774, 9802, 10087, 10386, 11367 • TIS "Drinking Water" standards 266, 459, 2512 • TIS standards 3324, 4081, 7787, 11174, 11511 and standards related to water analysis 	<ul style="list-style-type: none"> • There is not enough efficiency in the planning and implementation of irrigation investments and in the management of existing irrigation schemes. • Erroneous irrigation practices leads to waste of water and to salination and desertification of land. • Use of resources formed by wastewater charges for other purposes by municipalities restricts available resources. • Efficacy of controls is reduced since monitoring work is mostly left to enterprises with discharge permits. • Quality classification and quality atlases of water resources which are both essential in terms of the SKKY could be realized in very limited areas as pilot work. Water quality assessment work done by the DSI is limited to some surface waters. • Pollution charges and fines are not deterring enough • Resource constraints of especially local governments prevent timely and proper completion of infrastructure works. Water pricing schemes of many municipalities do not meet even their expenses of operation and maintenance. There are some municipalities which do not even charge for water. • Since only hydraulic data are considered in large scale irrigation projects and developments in the upper basin are not properly taken into account, problems emerge as to the operation of such facilities.

Table 3.3: Potentials and Constraints in Relation to the Management of Land and Range Resources

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
<ul style="list-style-type: none"> • Articles 44 and 45 of the Constitution • Environment Act no. 287 (Articles 1, 3, 9, 10 and 13) • Forest Act no. 6831 (Articles 16, 23, and 57) • Act no. 3800 on the Establishment of the Ministry of Forestry (Articles 2/d and 9) • Act no. 4122 on the National Mobilization for Afforestation and Erosion Control • Act no. 2924 on the Support to the Development of Forest Villages • Act no. 3202 on the General Directorate of Rural Services (GDRS) • Agricultural Reform Act no. 3083 on Land Arrangements Under Irrigation • Act no. 6200 on the Organization and Duties of the General Directorate of State Hydraulic Works (DSI) • Act no. 4070 on the Sale of Agricultural Land Belonging to the Treasury • Village Act no. 442 • Civil Code no. 743 • General Hygiene Act no. 1593 • Act no. 6968 on Agricultural Combat and Quarantine • Settlement Act no. 2510 • Act no 3091 on the Prevention of Violations of Possession on Immovable Property • Title Deed Registration Act no. 766 	<ul style="list-style-type: none"> • Ministry of Agriculture, GDRS • General Directorate of DSI • General Directorate of Afforestation and Erosion Control • STRIT • SIS • TIS • Agriculture and Forestry Faculties of Universities • UCTEA, Chamber of Forest Engineers • UCTEA, Chamber of Agricultural Engineers • Voluntary Organizations <p>UCTEA: Union of Chambers of Turkish Engineers and Architects</p>	<ul style="list-style-type: none"> • Existing topography, climate, and the characteristics of land and soil facilitate erosion and wash away. • Data base on the capacity classification of lands is not update and has deficiencies in many respects. This situation leaves the success of planning and investment works to contingencies. • Failure in translating into life of approaches which envisage the joint evaluation, planning, and implementation of activities for the preservation and improvement of land and water resources together with vegetation cover. • Lack of planning work on the capacity classification of available lands leads to the improper and out-of-purpose use of agricultural land. Especially the existing legislation on public works and municipalities encourages such tendencies. • Rights of land ownership are not accompanied with obligations on the preservation of land resources. Thus it becomes very difficult to prevent the emergence of problems in the origin. • Efficient land resources management is also lamed by the yet incomplete status of cadastry work

Table 3.3. Potentials and Constraints in Relation to the Management of Land and Range Resources

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

<ul style="list-style-type: none"> • Cadastry Act no. 3402 • Regulation on the out-of-purpose Utilization of Agricultural Lands 		<ul style="list-style-type: none"> • Utilization of ranges is not arranged in terms of the ecological, technical, economic and social dimensions of the issue. Hence, ranges are rapidly losing their productivity and biological diversity, both of which further aggravate the problem of erosion. • Efforts concentrating solely on yield increases make it more difficult to prevent the use of erroneous methods, techniques and practices in tilling, irrigation, fertilization, and pest management, etc. • There is the lack of relevant legislative arrangements to prevent harms on agricultural lands by earthenware industries, mines and quarries. • Schemes for supporting farmers do not include sanctions for the conservation of land resources. Hence measures to this end is left to chance while farmers are encouraged to practice agriculture on land not fit for it. • Resources for preventing erosion and improving agricultural lands can not be raised enough; this inadequacy of resources facilitates the severity of all adverse processes.
---	--	--

Table 3.4: Potentials and Constraints in Relation to the Management of Forest Resources

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

<ul style="list-style-type: none"> Articles 44, 46, 169, and 170 of The Constitution Act no. 6831 on Forests Act no. 4122 on National Mobilization for Afforestation and Erosion Control (NMAEC) Act no 2924 on Support to the Development of Forest Villages (SDFV) Act no. 2872 on National Parks Act no. 3800 on the Establishment of the Ministry of Forestry Act no. 3234 on the Establishment of the General Directorate of Forestry Act no. 2634 on Incentives to Tourism Cadastry Act no. 3402 Act no. 3213 on Mines Environment Act no. 2872 Act no. 2863 on the Preservation of Cultural and Natural Entities Regulation on State Forestry Enterprises and Revolving Fund Regulation on Afforestation Regulation on Afforestation Funds 	<ul style="list-style-type: none"> Ministry of Forestry (General Directorates of Afforestation and Erosion Control, Relations with Forest Villagers, National Parks and Wild Life) Ministry of Environment General Directorate of Forestry 11 Research Institutes within the Body of the Ministry of Forestry Universities STRIT UCTEA, Chamber of Forest Engineers Voluntary Organizations 	<ul style="list-style-type: none"> The primary problem area in the management of forest resources in Turkey consists of the problems and constraints posed by the Constitutional and other legislative arrangements. In this context, the Constitution i) brings the possibility of establishing easement by stating that "public benefit" is attached to forests. However, since a clear definition of "public benefit" is not made, utilization of forest resources for non-forestry purposes becomes easier, and this vagueness becomes the basis of the sanctions of especially articles 17 and 115 of the Act no. 6831; Act no. 2873 on National Parks; and Act no. 2634 on Incentives to Tourism. It further makes it possible to take some forest lands apart from the domain of general forestry management on the grounds that some forests lands may be labeled as "i) no use in to keep as forest land; ii) lost the quality of being considered as forest before the date 31.12.1982; iii) overwhelmed by village and town settlements." Furthermore, in Article 1 of the Forestry Act, forest is defined in a way to be conceived as a conglomerate of trees rather than an ecosystem. Since the definition makes too large definitions of areas which can not be considered as forests and trees which can not be classified as forest trees, forest lands are made narrower.
--	---	--

Table 3.4. Potentials and Constraints in Relation to the Management of Forest Resources

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

<ul style="list-style-type: none"> • Regulation on the Allotment of Forest Lands • NMAEC Regulation • Regulation on the Development of Forest Villages • EIA Regulation • SDFV Regulation • Regulation on Areas Which are to be Taken out of Forest Boundaries According to Paragraph 'A' of Article 2 of the Act no. 6831 on Forests • Regulation on Areas Which are to be Taken out of Forest Boundaries According to Paragraph 'B' of Article 2 of the Act no. 6831 on Forests • Regulation on the Preparation of Forest Management Plans • Circular on the Conduct of Practices in Preventing and Extinguishing Forest Fires • UN Principles of Forestry • Convention on the Preservation of the Cultural and Natural Heritage of the World 		<ul style="list-style-type: none"> • The allocation of forests as places of settlement and agriculture to those who are considered as forest villagers gains a permanent character. In commissions which are involved in forest land cadastry and delineation according to Articles 7-11 of the Act, the weight of the members who have educational background in forestry is too low to be determinative in decisions. What is determinative in such commissions are those who can not be expected to resist to the pressures of the local social pressures. Articles 16, 17, and 18 of the Act make it possible to utilize forests for non-forestry purposes. Revision of the Act which enlarges the possible area of construction from 2% to 6% in places which are classified as "private forest" encourages settlement in forest lands. Meanwhile, by making it possible to initiate "private forests" within state forests by way of private afforestation, Article 57 of the Act opens the way to the privatization of forests in a devious manner. • The Cadastry Act authorizes commissions including members who have no forestry education background to conduct the cadastry work of state forests. This practice deprives forest delineation work from its essential technical basis. The Act on Incentives to Tourism introduces the possibility of allocating state forest patches in what is demarcated as tourism centers to national or foreign private persons or companies for a period of 49, and 99 years to build touristic facilities. This is another loophole giving way to the settlements in forests.
--	--	---

Table 3.4 Potentials and Constraints in Relation to the Management of Forest Resources

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

<ul style="list-style-type: none"> • TIS "Environmental Air" standards 9733, 9734 and 1052, and about 60 more standards related to forestry 		<ul style="list-style-type: none"> • The Act on National Parks too allows for forest land allocations for investments in tourism. • The Act on the Support for the Development of Forest Villagers allows for the resettlement of those living in forest lands in other areas which are excluded from the scope of state forests; and for allocation of farm land to such settlers. • In the present organization of forestry, the possibility of conducting integrated work is largely limited. Conduct of afforestation, national park, village development and forestry management activities by different organizations, at different localities and with different timing leads to the waste of resources and impairs the efficiency of such activities. • Infrastructures required by forestry activities have not been completed yet. Qualitative and quantitative inadequacy of forest inventories and plans lower the efficiency of forest conservation and development works. • Forest-forest villager relationship has not been raised to a satisfactory level yet. About 10 million people living in or near forests still bluntly provide for their fuelwood, farmland, and range needs. • Quality of forestry services is also lowered by the gap between the content of forestry education and the hard realities of actual forestry life.
--	--	---

Table 3.5: Potentials and Constraints in Relation to the Problem of Noise

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

<ul style="list-style-type: none"> • Civil Code (Article 661/2) • Turkish Penal Code (Article 645) • Act no. 1593 on General Hygiene (Articles 268-274) • Urban Development Act no. 3194 (Article 40) • Act no. 2918 on Highway Traffic (Article 30) • Environment Act no. 2872 (Article 2) • Noise Control Regulation (NCR) • Regulations for Worker Health and Work Security • Circular on the Maximum External Noise for Vehicles with 4 or More Wheels in Traffic 	<ul style="list-style-type: none"> • Ministry of Environment, General Directorate of Pollution Prevention and Control • General Directorate of Civil Aeronautics • Governorates • Ministry of Labor, Worker Health and Work Security Centers • Provincial Environment Foundations • SIS • TIS • Universities • Voluntary Organizations • TIS standards 2607, 2673, 2726, 5960, 9315, 9798, and 19792 	<ul style="list-style-type: none"> • Inadequacy of personnel, materials and equipment to be used in the identification and management of the sources of noise limits noise measurement, monitoring and prevention works in several ways. • The General Directorate of State Highways which is in charge of the technical supervision of vehicles has not yet started noise measurements. Consequently, the control of noise originating from traffic is limited from the very start. • Absence of any systematic approach and arrangement on the elimination of causes which lead to noise along railways is another constraint • Continuation of work in railway, port and airport constructions by the contracting firm also in time intervals which is subject to limitations by the NCR by getting special permission encourages other unruly practices. • Supervision activities are lamed by conflicting situations which arise from different limit values imposed on work places by the Regulation on Worker Health and Work Security, and on recreational halls by the NCR of the Ministry of Environment. • The effect of the problem of noise is further aggravated by the absence of systematic arrangements on such high noise environments as education and health institutions and sports fields. • Effective management of the sources of noise becomes impossible due to the absence of zones delineated in line with international standards. • Development of realistic noise prevention strategies is hindered by the insufficiency of R&D work.
--	--	--

Table 3.6: Potentials and Constraints in Relation to the Preservation of Wetlands

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
<ul style="list-style-type: none"> • Convention on Wetlands of International Importance Especially as the Living Environments of Water Birds (RAMSAR) • Act no. 5516 on the Drainage of Swamps and on the Use of Land Gained by Drainage • Act on Malaria Eradication • Act no. 2873 on National Parks • Act no. 6200 on the Organization and Duties of the General Directorate of State Hydraulic Works • Regulation on EIA • Prime Ministerial Circular dated 11 January 1993 	<ul style="list-style-type: none"> • Ministry of Environment • Ministry of Forestry, General Directorate of National Parks and Hunting-Wild Life • Council for the Preservation of Cultural and Natural Entities • General Directorate of Rural Services 	<ul style="list-style-type: none"> • Giving effect to policies for the preservation of wetlands is difficult because of the insufficiency of information regarding the quality and quantity of such lands. • Activities for the preservation of wetlands meet obstacles in many cases because of the lack of awareness on the part of the public that such lands are extremely sensitive to special and external factors. • Failure to prevent reed cutting, hunting, water drawing, draining, and use of chemicals against mosquitoes, etc. reduce the biological richness of wetlands.

Table 3.7: Potentials and Constraints in Relation to Solid Waste Management

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
<ul style="list-style-type: none"> • BASEL Convention on the Control of Transboundary Transport and Elimination of Hazardous Wastes • Environment Act no. 2872 • Act no. 2464 on Municipal Revenues (Article 44 annexed by the act no. 3914) • Regulation on the Control of Solid Wastes • Regulation on the Control of Hazardous Waste (RCHW) • Regulation on the Control of Medical Wastes • Regulation on the Control of Hazardous Chemical Substances and Products 	<ul style="list-style-type: none"> • Ministry of Environment • Governorates • Greater City and District Municipalities • National Solid Waste Committee • STRIT • Universities • Industrial Enterprises • Chambers of Professionals • Voluntary Organizations • Istanbul Chamber of Industry, Series 9000 • TIS Standards 9394, 11250, 11638, 11690, 11707 and 11708 	<ul style="list-style-type: none"> • The practice of "Environmental Cleanliness Tax" included in Municipal revenues does not encourage solid waste reduction and recycling. Determination of the amount of "tax" by the neighborhood characteristics of the origin of waste instead of its quality and quantity restricts the diffusion of the tendency to reduce and regain solid wastes. • Incentives and disincentives are not sufficient to reduce the quality and quantity of packing, and to convince consumers to use goods with less waste and packing. • Standards have not been developed for easily identifiable garbage cans, containers and carriage vehicles; container cleansing materials; mechanical parts in transfer stations; geotextile and geomembrane; biogas collection pipes; incineration facilities; generators for producing energy from biogas; leakage collection pipes and pumps; and mechanic standards for compost facilities. • Lack of know-how, financial resources, personnel and materials-equipment lower the effectiveness of solid waste management policies of local governments. • Coincidence of executive and inspection functions in solid waste management services in the same organization (i.e. the local government) hinders the effective working of the process. • Municipalities have limited resources for the appropriate collection, transport, and discharge of medical wastes.

Table 3.7. Potentials and Constraints in Relation to Solid Waste Management

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

		<ul style="list-style-type: none"> • Mixed collection of solid wastes in the origin as a general tendency makes it impossible to separate and classify recyclable materials in a way to allow processing. • There are no inventory works to determine the quality and quantity of hazardous waste in a detailed way to cover all sectors • Presently Turkey lacks proper incineration and/or elimination facilities which will treat wastes in a way not to generate environmental problems. Randomly made incineration, and especially the consumption of used motor oil for obtaining heating energy generate various environmental problems. • Mistakes made in site selection and insufficient infrastructure make solid waste discharge sites "environmental problem" areas. • R CHW largely bans the storing of hazardous wastes in the same site with domestic wastes. Since Municipalities already have only limited capacity to discharge domestic solid waste, they mostly tend to defer this duty under legal pretext. • Administrative authorities' collection of fines introduced by regulations within the framework of "public revenues" lower the effectiveness of work. • Absence of a "waste exchange" in Turkey yet precludes the economic valorization of wastes, and consequently leaves tidiness in collection and storage to chance
--	--	---

Table 3.8: Potentials and Constraints in Relation to the Management of Marine Resources

Legal Potentials	Institutional and Technical Potentials	Problems-Constraints
------------------	--	----------------------

<ul style="list-style-type: none"> • Convention on the Protection of Black Sea from Pollution • Protocol on the Protection of the Mediterranean from Pollutants of Land Origin • Convention on the Protection of the Mediterranean from Pollution • Protocol on the Prevention of Aerial and Navigational Discharges to the Mediterranean • Protocol on Urgent Cooperation Against the Pollution of the Mediterranean by Petroleum and other Hazardous Substances • Agreement on the Establishment of a General Fishing Council for the Mediterranean • Convention Banning the Test of Nuclear Weapons in the Atmosphere, Space, and Under the Water. • Act no. 2692 on the Coastal Guard Command • Environment Act no. 2872 • Act no. 1380 on Water Products • Regulation on the Control of Water Pollution • Circular on the Hazardous and Harmful Substances in Waters 	<ul style="list-style-type: none"> • UNEP • Mediterranean Action Plan • NATO Committee on the Problems of the Modern Society • UN GEF (Global Environment and Facility) Program • Convention on Life Assurance in Sea (OLAS) • International Convention on the Prevention of Sea Pollution by Maritime Vessels (MARPOL) • Undersecretariat of Maritime Issues • Municipalities • Universities (Maritime Sciences Institutes) • Ministry of Tourism 	<ul style="list-style-type: none"> • Though having characteristics which require management by international agreements, Black Sea, the Aegean Sea and the Mediterranean are being rapidly polluted in spite of the abundance of documents such as agreements, conventions, protocols, etc. Especially in Black Sea the speed and density of pollution have assumed such dimensions as to prevent the ecosystem from renewing itself. • Delays in the completion of infrastructure investments leads to the discharge into sea of domestic wastes which mount parallel to the population growth along the shores. • Fishing activities can not be managed and arranged in a way so as not to harm the biological diversity of seas. • Efforts for forming a data base regarding formations taking place in seas are both new and devoid of details. Such data do not cover long terms and do not show any frequency and consistency to yield statistically reliable results • Laboratory equipment required especially for determining the nature and densities of micro-pollutants are not advanced enough. • "Act on the Plan for Urgent Intervention" regarding seas has not been passed yet.
---	--	--

ANNEX 4

Environmental Regulations and Standards

Articles of “Air Quality Protection Regulation”, “Water Pollution Control Regulation” and “Noise Control Regulation” regarding to air quality, water quality and noise level standards are quoted below. Please refer to the said regulations for details of sampling and emission calculations, sectoral wastewater discharge limits

AIR QUALITY PROTECTION REGULATION

SECTION TWO

Air Quality Limits, Emission Limits for Industrial Plants Subject to Permission

Air Quality Limits

Article 6.

1. Air Quality Limits: To protect human health and to prevent short and long term harmful effects on the environment, the levels of air pollutants, expressed in units of concentration and determined by taking into account their various harmful effects when they are found in combination in the atmosphere.

A. Long Term Standards (LTS)

Values that are the arithmetic average of all measurement results, and that must not be exceeded.

B: Short Term Standards (STS)

Values that must not exceed 95% of the measurement results when the numerical values of all measurement results, in the form of maximum daily averages or statistics, are arranged by size. In the case of settling dust, in contrast, these values refer to the maximum monthly averages that must not be exceeded.

The periods of time generally envisaged for LT and ST standards cover one year periods. Exceptions to this are indicated in Annex 2 of the Regulation.

The long and short term standards for various air pollutants that must be complied with are given below.

		Unit	LTS	STS
1.	Sulphur Dioxide (SO ₂)			
	including Sulphur Trioxide (SO ₃)			
	a) General	µg/m ³	150	400 (900)
	b) Industrial Zones	µg/m ³	250	400 (900)
2.	Carbon Monoxide (CO)	µg/m ³	10000	30000 (900)
3.	Nitrogen Dioxide (NO ₂)	µg/m ³	100	300
4.	Nitrogen Monoxide (NO)	µg/m ³	200	600
5.	Chlorine (Cl ₂)	µg/m ³	100	300
6.	Hydrogen Chloride (HCl) and Gaseous Inorganic Chlorine (Cl)	µg/m ³	100	300
7.	Hydrogen Fluoride (HF) and Gaseous Inorganic Fluorine (F)	µg/m ³	-	10 (30)
8.	Ozone (O ₃) Photochemical Oxidisers	µg/m ³	-	(240)
9.	Hydrocarbons (HC)	µg/m ³	-	140 (280)
10.	Hydrogen Sulphide (H ₂ S)	µg/m ³	-	40 (100)
11.	Suspended Particulate Matter (Particles of 10 microns and smaller)			
	a) General	µg/m ³	150	300
	b) Industrial Zones	µg/m ³	200	400
12.	Lead (Pb) in PM and its compounds	µg/m ³	2	-
13.	Cadmium (Cd) in PM and its compounds	µg/m ³	0.04	-

14.	Settling Dust (including particles larger than 10 microns)	mg/m ² day		
	a) General		350	650
	b) Industrial Zones		450	800
15.	Lead (Pb) and its compounds in Settling Dust	µg/m ² day	500	-
16.	Cadmium (Cd) and its compounds in Settling Dust	µg/m ² day	7.5	-
	Thallium (Tl) and its compounds in Settling Dust	µg/m ² day	10	-

Note: The figures in parentheses are maximum hourly reference standards.

C. Average Winter Standards

The averages of the measurements made in residential areas between October and March for air pollutants arising from the heating of buildings in winter will be compared with the winter average LT standards that must not be exceeded.

	<u>Average Winter Standards</u>
Sulphur Dioxide	250 µg/m ³
Suspended Particulate Matter	200 µg/m ³

2. When the limits stated in the paragraph 1 are reached, the local environmental units shall develop programs to improve air quality. Targeted limits have been prescribed for widespread air pollutants, which will be lowered to more stringent levels over time to attain cleaner air quality. The following target standards have been established for sulphur dioxide and suspended particulate matter. Programs are being developed to achieve these targets as soon as possible. During plant construction, air quality protection measures will be taken based on the LT and ST standards in effect at the time.

<u>Target Standards</u>	<u>SO₂ (µg/m³)</u>	<u>PM (µg/m³)</u>
Annual Arithmetic Average	60	60
Winter (Oct-Mar) Average	120	120
Maximum 24-hour Limit	150	150
One-hour Limit	450	-

3. The following special standards apply to sulphur dioxide, gaseous inorganic chlorine and fluorine compounds, and amounts of lead and cadmium in settling dust, particularly in special conservation areas designed to protect sensitive animals, plants and objects from the harmful effects of air pollution.

	Unit	LTS
Sulphur Dioxide	$\mu\text{g}/\text{m}^3$	60
Gaseous Inorganic Chlorine Compounds	$\mu\text{g}/\text{m}^3$	60
Gaseous Inorganic Fluorine Compounds	$\mu\text{g}/\text{m}^3$	0.3
Lead	$\mu\text{g}/\text{m}^2 \text{ day}$	250
Cadmium	$\mu\text{g}/\text{m}^2 \text{ day}$	2.5

4. The air quality standards to be complied with at petrochemical plants and oil refineries are as follows:

	Unit	Primary Standard (*)	Secondary Standard (*)
Benzene	$\mu\text{g}/\text{m}^3$	5.0	10.0
Toluene	$\mu\text{g}/\text{m}^3$	2.0	6.0
Xylene	$\mu\text{g}/\text{m}^3$	1.5	6.0
Olefins	$\mu\text{g}/\text{m}^3$	1.5	3.0
Total Organic Vapours (carbon type)	$\mu\text{g}/\text{m}^3$	2.0	10.0
Ethyl Benzene	$\mu\text{g}/\text{m}^3$	0.02	3.0
Isopropyl Benzene	$\mu\text{g}/\text{m}^3$	0.02	2.0
Trimethyl Benzene	$\mu\text{g}/\text{m}^3$	0.02	1.0
Mercaptans	$\mu\text{g}/\text{m}^3$	0.005	0.06
Tetraethyl, Tetramethyl Lead	$\mu\text{g}/\text{m}^3$	-	0.001

(*) If these standards are exceeded for more than 6% of total hours within one year, serious discomfort may occur and the plant will be regarded as not having fulfilled the conditions for permission.

(**) These standards must not be exceeded for more than 1% of total hours within one year. Measurements are given as hourly averages.

5. Measurement and determination of air pollution levels shall be conducted in accordance with the principles in Annex 2 of the Regulation.

Emission Standards for Industrial Plants Subject to Permission

Article 7.

If no restriction of any kind has been introduced in Article 9 on a plant subject to the permission governed by Articles 10-28, compliance with the emission standards given in Articles 7 and 8 is mandatory.

1. Soot

A- Plume opacity of waste gases at solid fuel-fired plants shall be kept to 2 or less on the Ringelmann Chart.

B- Plume opacity of waste gases at new liquid fuel-fired plants may be at most 2 on the Bacharach scale at diesel fuel-fired plants, at most 3 at no.4 and 5 fuel oil -fired plants, and at most 4 at no. 6 fuel oil-fired plants.

Plume opacity standards for plants constructed and set in operation before the publication of this regulation are found by adding one to the limits stated in the first sentence of this paragraph.

2. Emissions in the Form of Dust

A- Emissions in the form of dust found in the waste gases and not classified in paragraph B below may not exceed the standards given in paragraph 3 and diagram 1.

B- If the dust emissions caused by the gases discharged from filing, separating, sifting, transporting, crushing and grinding plants are as much as 3 kg/h, the dust concentration in the waste gases shall be kept below 300 mg/m³ , and if the emissions produced are over 3 kg/h, the dust concentration in the waste gases shall be kept below 150 mg/m³.

3. Standards governing Special Dust Emissions in Waste Gases

The special dust emissions classified as I, II and III according to their chemical characteristics in the Annexes of the Regulation.

Class I dust emissions (for emissions flows of 0.1 kg/h and up)	20 mg/m ³
Class II dust emissions (for emissions flows of 1 kg/h and up)	50 mg/m ³
Class III dust emissions (for emissions flows of 3 kg/h and up)	75 mg/m ³

If special dust emissions of classes I and II occur together, the total emission concentration may not exceed 50 mg/m³, and if dust emissions of classes I, II and III are found together, the total emission concentration may not exceed 75 mg/m³.

NOISE CONTROL REGULATION

Standards

Table 1

Type of Vehicle	Maximum Noise Level (dBA)
Automobile	75
Bus (in city)	85
(outside city)	80
Heavy vehicles (in driver's cabin) and Trucks (at 80 km/h)	85
Locomotive interiors (Diesel-engine, operating at full power and load at 80 km/h with windows closed)	85
Electrical train locomotives	80
Railroad car interiors	70

Table 2

Period of Exposure to Noise (hour/day)	Maximum Noise Level (dBA)
7.5	80
4	90
2	95
1	100
0.5	105

0.25	110
1/8	115

The maximum level of impact noise may not exceed 140 dBA.

Table 3

	Zone Definition	Basic Criterion (Leq:35-45 dBA)
Zone I	Residential area outside city (far from traffic)	0
Zone II	Dwellings at city's edge	+5
	Urban residential area (100 m. from traffic flow)	+10
	Urban residential area, main roads, workplaces (60 m. from traffic flow)	+15
Zone III	City-centre residential area, main roads, workplaces (60 m. from traffic flow)	+20
Zone IV	Industrial zone or main roads where heavy vehicles and buses pass	+25
	Time of Day	
	Daytime (06:00 - 19:00)	0
	Evening (19:00 - 22:00)	-5
	Night (22:00 - 06:00)	-10

Note: The basic criterion for noise sensitive areas and future planning is 35 dBA.

Table 4

Source of Noise	Leq (dBA)	
	Daytime (06:00 - 22:00)	Night (22:00 - 06:00)
Railroad Noise	65	55
Industrial Noise		

- Continuous	65	55
- Sudden	70	60
Construction Site Noise		
- Building construction (continuous)	70	-
- Road construction (temporary)	75	-
- Impact noise	100 (L _{max})	
Airports (or equivalent WECPNL values)	70	60

WATER POLLUTION CONTROL REGULATION

Table 1: Quality Criteria of Inland Water Resources by Class

Water Quality Parameter		Water Quality Classes			
		I	II	III	IV
A)	Physical and inorganic-chemical parameters				
1.	Temperature (°C)	25	25	30	>30
2.	pH	6.5 - 8.5	6.5 - 8.5	6.0 - 9.0	outside 6.0 - 9.0
3.	Dissolved Oxygen (mg O ₂ /l) ^a	8	4	3	<3
4.	Oxygen Saturation (%) ^a	90	70	40	<40
5.	Chlorine Ions (mg Cl/l)	25	200	400 ^b	>400
6.	Sulphate Ions (mg SO ₄ /l)	200	200	400	>400
7.	Nitrogen as Ammonia (mg NH ₄ -N/l)	0.2 ^c	1 ^c	2 ^c	>2
8.	Nitrogen as Nitrite (mg NO ₂ -N/l)	0.002	0.01	0.05	>0.05
9.	Nitrogen as Nitrate (mg NO ₃ -N/l)	5	10	20	>20
10.	Total Phosphorus (mg PO ₄ -P/l)	0.02	0.16	0.65	>0.65
11.	Total Dissolved Matter (mg/l)	500	1500	5000	5000
12.	Colour (Pt-Co units)	5	50	300	>300
13.	Sodium (mg Na ⁺ /l)	125	125	250	>250
B)	Organic Parameters				
1.	COD (mg/l)	25	50	70	>70
2.	BOD (mg/l)	4	8	20	>20
3.	Organic Carbon (mg/l)	5	8	12	>12
4.	Total Kjeldahl Nitrogen (mg/l)	0.5	1.5	5	>5
5.	Emulsified oil and Grease (mg/l)	0.02	0.3	0.5	>0.5
6.	Methylene blue active substances (MBAS) (mg/l)	0.05	0.2	1	>1.5
7.	Phenolic substances (airborne) (mg/l)	0.002	0.001	0.1	>0.1
8.	Mineral oils and derivatives (mg/l)	0.02	0.1	0.5	>0.5
9.	Total pesticides (mg/l)	0.001	0.01	0.1	>0.1
C)	Inorganic Pollution Parameters^d				
1.	Mercury (µg Hg/l)	0.1	0.5	2	>2
2.	Cadmium (µg Cd/l)	3	5	10	>10
3.	Lead (µg Pb/l)	10	10	50	>50
4.	Arsenic (µg As/l)	20	50	100	>100
5.	Copper (µg Cu/l)	20	50	200	>200
6.	Chromium (total) (µg Cr/l)	20	20	200	>200
7.	Chromium (µg Cr ⁺⁶ /l)	indeterminable	20	50	>50
8.	Cobalt (µg Co/l)	10	20	200	>200
9.	Nickel (µg Ni/l)	20	50	200	>200
10.	Zinc (µg Zn/l)	200	500	2000	>2000

	Water Quality Parameter	Water Quality Classes			
		I	II	III	IV
11.	Cyanide (total) ($\mu\text{g CN/l}$)	10	50	100	>100
12.	Fluorine ($\mu\text{g F/l}$)	1000	1500	2000	>2000
13.	Free Chlorine ($\mu\text{g Cl}_2/\text{l}$)	10	10	50	50
14.	Sulfur ($\mu\text{g S/l}$)	2	2	10	>10
15.	Iron ($\mu\text{g Fe/l}$)	300	1000	5000	>5000
16.	Manganese ($\mu\text{g Mn/l}$)	100	500	3000	>3000
17.	Boron ($\mu\text{g B/l}$)	1000 ^e	1000 ^e	1000 ^e	>1000
18.	Selenium ($\mu\text{g Se/l}$)	10	10	20	>20
19.	Barium ($\mu\text{g Ba/l}$)	1000	2000	2000	>2000
20.	Aluminium ($\mu\text{g Al/l}$)	0.3	0.3	1	>1
21.	Radioactivity (pCi/l)				
	-alpha-activity	1	10	10	>10
	-beta-activity	10	100	100	>100
D) Bacteriological Parameters					
1.	Fecal coliform (MPN/100 ml)	10	200	2000	>2000
2.	Total coliform (MPN/100 ml)	100	2000	10000	>10000

- It is sufficient to ensure concentration and percentage saturation of only one of the parameters.
- It may be necessary to lower the limit of this concentration for irrigation of chlorine-sensitive plants.
- The concentration of free ammonia may not exceed 0.02 mg $\text{NH}_3\text{-N/l}$ depending on pH.
- Criteria in this group give total concentrations of chemical derivatives constituting parameters.
- These criteria may have to be lowered to 300 $\mu\text{g/l}$ for irrigation of boron-sensitive plants.

Table 2: Eutrophication Control Limit Values in Lakes, Ponds, Marshes and Dam Reservoirs

Desired Properties	Area of Use	
	Nature Conservation Areas & Recreation	Various Uses (including natural salt bitter and soda rich lakes)
pH	6.5 - 8.5	6 - 10.5
COD (mg/l)	3	8
Dissolved Oxygen (mg/l)	7.5	5
Suspended Solids (mg/l)	5	15
Total coliform (MPN/100 ml)	1000	1000
Total Nitrogen (mg/l)	0.1	1
Total Phosphorus (mg/l)	0.005	0.1

Table 3: Standards for Coastal and Sea Waters Used for Recreational Purposes

Parameter	Standard	Remarks
Colour	Natural	Should not differ aesthetically from the natural colour of sea water
Taste and odour	Natural	May not be other than natural taste and odour
Transparency	More than 2 meters	The natural turbidity of sea water. Not be less than 2 m. as measured by Secchi disk.
pH	6-9	
Oil & grease (mg/l)		Should not differ aesthetically from the natural oil and grease content of sea water
Total coliform (MPN/100 ml)	1000	Every 15 days, or at the request of the Administration in doubtful cases; by membrane filter or multi-tube fermentation
Fecal coliform (MPN/100 ml)	200	
Surface active substances showing a reaction to methylene blue	Should not form persistent foam. Less than the equivalent of 0.3 mg/l lauril sulphate	Equivalent of mg/l lauril sulphate as analysed at the request of the relevant Administration in any doubtful cases.
Phenols (mg/l)	So little as to give off no phenol odour but less than 0.005 mg/l	Must not exceed the standard when analysed at the request of the relevant Administration in any doubtful cases.
Dissolved Oxygen	Not less than 80% saturation	
Tar residues & floating materials	None	

Table 4: General Quality Criteria for Sea Water

Parameter	Criteria	Remarks
pH	6.0 - 9.0	
Colour and Turbidity	Natural	Should be such as not to affect more than 90% of the normal level of photosynthetic activity required for natural marine life at measurement depth.
Floating material		Floating oil, tar, garbage, and other liquids and solids must not be found.
Suspended solids (mg/l)	30	
Dissolved Oxygen (mg/l)	More than 90% saturation	Dissolved oxygen levels should be monitored at all depths.
Crude oil and oil derivatives (mg/l)	0.003	Water, biota and sediment should be evaluated separately; preferably none should be found at all.
Radioactivity		Should not exceed natural types and levels of radioactivity for the particular marine environment. Artificial radioactivity should be indeterminable.
Productivity	-	Seasonal productivity levels for the particular marine environment should be preserved.
Toxicity	None	
Phenols (mg/l)	0.001	
Heavy Metals		
Copper (mg/l)	0.01	
Cadmium (mg/l)	0.01	
Chromium (mg/l)	0.1	
Lead (mg/l)	0.1	
Nickel (mg/l)	0.1	
Zinc (mg/l)	0.1	
Mercury (mg/l)	0.004	
Arsenic (mg/l)	0.1	
Ammonia (mg/l)	0.02	

ANNEX 5

Staffing and Structure of the Ministry of Environment

Within the organisational Structure of the Ministry of Environment³⁵, there are General Directorates of Environmental Impact Assessment, Pollution Prevention and Control, and Environmental Protection that constitute the main functional units. A simplified organisational

³⁵ For simplicity, this chart shows only the key functional units of the Ministry. A complete chart would also include the Ministry's legal, financial and administrative units.

chart for them ministry, showing this General Directorates and their sub-directorates, depicted in figure A5.1. At the provincial level, “Provincial Directorates of Environment” are planned for all 80 provinces; as of 1995, they were organised in 33 provinces. At the central level, the Ministry employs 563 civil servants and 80 consultants. Provincially, there are 296 civil servants and 120 consultants. Centrally, 35% of the staff are technical and 65% are administrative or service personnel. Provincially, 63% of the staff are technical and 37% are administrative or service-oriented (ME, 1997).

ANNEX 6

Sectoral Options for Environmental Management

The environmental problem areas profiled in Chapter 3 (urban environment, natural resource management, marine and coastal resources, biological diversity, cultural and natural heritage, and environmental risks) can be used as the basis for developing sectoral options. This list has been modified by: (a) adding population growth and urbanization as a problem area of cross-cutting importance; (b) adding the energy sector as a problem area because of its impact on especially air quality; and (c) removing biological diversity as a direct problem area for the NEAP because of the existence of a detailed national strategy in this area. The resulting problem areas for the NEAP are summarized in Table A6.1.

Table A6.1: Problem Areas and Action Categories Used as Basis for Sectoral Options

Problem Areas	Coverage
Population/Urbanization	Quality, Quantity, Density, Movements
Air Quality	Monitoring,
Energy Generation and Consumption	Production, Distribution, Consumption; Development of New/Renewable Sources, Conservancy
Water and Wastewater Management	Rivers; Seas; Lakes; Ponds, Groundwater, Wastewater.
Solid and Hazardous Wastes	Domestic; Industrial; Hazardous; Medical (Liquid, Solid, Gas)
Noise	Traffic; Industry
Soil and Land Use	Erosion; Pollution; Misuse of Agricultural Lands; Desertification; Salination; Mining Industry, Agricultural Technology.
Forests/Vegetative Cover	Forests; Steppes; Ranges and pastures
Marine Resources, Coastal Zones and Sensitive Environments	Wetland; Shore; Island; Aquatic products, Mountain; Highland, Sand dunes
Historical, Cultural and Natural Heritage	Monuments; Ruins; Natural Formations; Endemic Plants Under the Threat of Extinction; Animals; Value Judgments
Action Categories	Areas
Policies	Economic, Social, Cultural and Sectoral
Institutional Reform	Ministries and Related Organizations; professional Organizations; Voluntary Organizations; Private and Public Sector Enterprises; Cooperatives; Management
Legislation	The Constitution, Laws, Regulations, By-laws; Circulars
Economic & Financial Measures	Taxes, Incentives, Subsidies, Funds; Fines, Voluntary Contributions
Education & Awareness	Non-formal and Formal Education; Arts; Religion
Participation	International, National and Local
Specific Tools	Planning (Urban Development, Environment, Sectoral and Action Plans); Monitoring and Supervision; Standardization; EIA, Data Collection

For each of problem area and sub-area, sectoral options for the NEAP have been drawn from a wealth of sources during the NEAP preparation process. These sources include: i) reports by the working groups; ii) conclusions of the search, ranking and decision conferences; iii) relevant policy documents, especially the SFYDP, and official reports; iv) international agreements and experience; v) the environmental management factors identified in Chapter 2; and vi) the environmental areas and dynamics profiled in Chapter 3.

The Urban Environment

Table A6.2: Options for Managing Population Growth and Migration

Areas of Action	Options
Policies	<ol style="list-style-type: none"> 1. Supplementing development policies to manage migration so as not to generate environmental problems 2. Promotion and development of medium-size settlements 3. Integration of carrying capacity considerations into urban development policies
Institutional Reform	<ol style="list-style-type: none"> 4. An organization at "Undersecretariat" level for the monitoring and orientation of population migration 5. Rearrangement of the duty domain of the General Directorate of Registration and Citizenship Affairs;
Legislative Arrangements	<ol style="list-style-type: none"> 6. Revising Act no. 1587 on population; 7. Modifying the job descriptions of environmental health technicians;
Education-Training	<ol style="list-style-type: none"> 8. Designing mass training programs targeting women from different social sections in order to enable their active participation for sustainable development; 9. Meeting the information and training materials needs of voluntary organizations; 10. Training activities to ensure the smooth urbanization of those migrating to cities; 11. Redefinition of the functions of parent-teacher associations; 12. Raising the school enrollment rates of girls;
Participation	<ol style="list-style-type: none"> 13. Organizations such as committees, councils, etc. for ensuring the participation of women in decision making processes in the General Directorate of Women's Status and problems;
Techniques	<ol style="list-style-type: none"> 14. Improving and extending family planning services; 15. Enhancing the choice of family planning methods; 16. Public health screenings; 17. Incorporation of population migration as a dynamic variable in EIA practices
R & D	<ol style="list-style-type: none"> 18. National and regional-level identification of the economic, social and cultural causes of population migration 19. Development of measures designed to manage population migration in areas where there are intensive environmental problems 20. Identification of the characteristics of the patterns of consumption and their trends with migration 21. Identification of public health priorities 22. Investigation of socio-demographic responses to environmental changes

Table A6.3: Options for Protecting and Improving Air Quality

Areas of Action	Options
Policies	<ol style="list-style-type: none"> 1. Support participation of Turkey in the NO_x Protocol; 2. Harmonize emission data with European Emission Data Bank (CORINAIR); 3. Adjustment to the European Automotive Exhaust Emission Standards; 4. Acceleration of existing program for wider use of unleaded gasoline;
Institutional Reform	<ol style="list-style-type: none"> 5. Increasing the number of measurement stations and their equipment with advanced devices; 6. Identification, procurement and use of air quality measurement devices; 7. Increasing the effectiveness of the Ministry of Environment in pollution monitoring and supervision; 8. Institutionalizing data collection, management and dissemination among MoH, ME and SIS 9. Delineating the work of the National Climate Coordination Committee;
Legislative Arrangements	<ol style="list-style-type: none"> 10. Revision of the Air Quality Control Regulation (AQCR), its simplification and updating ; 11. Upgrading the AQCR to facilitate the establishment of special monitoring systems in high pollution industrial enterprises and density areas; 12. Requiring EIA for urban development projects;
Economic & Financial Measures	<ol style="list-style-type: none"> 13. Contribution by entrepreneurs to pollution measurement and monitoring in areas where there are intensive industrial activities; 14. Support for the use of motor vehicles with catalytic converters; 15. Imposing charges on any excess over determined emission standards;
Education-Training	<ol style="list-style-type: none"> 16. Diffusion of extension activities by the Ministry of Environment; 17. Providing public information by local governments on the level of air pollution 18. Training municipalities on burning of garbage;
Techniques	<ol style="list-style-type: none"> 19. Support to enterprises that use emission reducing techniques and technologies; 20. Consideration of the Western Black Sea, Eastern Black Sea, Aegean, Marmara and Mediterranean as discrete regions with respect to air quality improvement activities; 21. Development of the cadastry of emission standards and their application; updating of cadastrics in specific periods along with unified methods for all provinces; 22. Enlargement of emission inventories so as to cover all province and district centers; inclusion of NO_x, HC's, VOC's and ozone emissions besides SO₂ and particulates in measurements; 23. Expansion of emission distribution models; 24. Qualitative evaluation of measurement data in specific periods; 25. Program for the maintenance of measurement devices; 26. Utilization of biological indicators in pollution monitoring; 27. Organization of "crisis management" in times and at places where air pollution has exceeded certain limits; establishment of public warning systems; 28. Arrangement of working hours and traffic flow with respect to the state of pollution, including use of coordinated traffic signals; as well as working our of traffic policemen who are exposed to heavy traffic emissions, 29. Preparation of "clean air plans" at province and district levels; 30. Establishment of urban forests and increased urban greenspace 31. Preventing combustion of waste mineral oil. 32. Substituting asbestos in insulation material and in car breaks.
R & D	<ol style="list-style-type: none"> 33. Identification of priority areas; 34. UV-B radiation measurements in Aegean and Mediterranean Regions, establishment of public warning systems; 35. Development of "critical load" criteria and measurement of "critical load" values; 36. Ensuring coordination of the R & D supports by the SPO, STRIT, and the Ministry of Environment; 37. Research on impact of air pollution and acid rains on forests.

Table A6.4: Options for the Production and Consumption of Energy

Areas of Action	Options
Policies	<ol style="list-style-type: none"> 1. Measures to encourage wider use of natural gas; 2. Substitution of alternative energy sources for wood as a source of energy and spread of the practice of forest management for energy; 3. Support the utilization of clean and renewable energy sources as well as passive solar energy applications; 4. Membership in the European Standard Experiment System (PASSYS); updating existing standards accordingly; elimination of deficiencies 5. Decentralization in energy generation; 6. Optimizing sustainability of energy supply and environmental costs 7. Setting integrated energy consumption targets for Organized Industrial Zones; 8. Prohibiting import of petro-coke;
Institutional Reform	<ol style="list-style-type: none"> 9. Establishment of an Energy Observatory; 10. Organization of energy crisis management units at national and regional levels; 11. Formation of certified consultant bureau for monitoring the energy-based pollution caused by public and private enterprises.
Legislative Arrangements	<ol style="list-style-type: none"> 12. Enforcement of regulations and other arrangements to regulate the energy efficiency of domestic appliances; 13. Implementation of Heat Insulation Regulation
Education-Training	<ol style="list-style-type: none"> 14. Organization of energy conservation training at adult education centers; 15. Introducing energy conservation in formal education 16. Organization of training for households in mass housing & rural areas.
Participation	<ol style="list-style-type: none"> 17. People's participation to design and implement energy conservation programs; 18. Formation of energy management units by entrepreneurs in organized industrial zones and small scale industrial sites.
Economic & Financial Measures	<ol style="list-style-type: none"> 19. Incentives for use of high quality coal (tax reductions, etc.); 20. Introduction of emission taxes in the pricing of fuels; 21. Application of real estate property taxes by considering the limits of energy consumption to be determined with respect to areas; 22. Support for the spread of energy-efficient and low emission techniques and technologies; 23. Incentives for improving quality of domestic coal; 24. Support for reducing sulfur in diesel, fuel oil and heating fuel. 25. Determination of value added tax rates linked to the energy efficiency of vehicles and equipment; 26. Differentiation in energy prices between urban and rural areas; 27. Encouraging R&D on cleaner technologies; 28. Encouraging wider use of co-generation and central heating;;
Techniques	<ol style="list-style-type: none"> 29. Widespread use of high quality (low sulfur, low ash, high heating value, low humidity) coal; 30. Encouraging the use of stack scrubbers, desulfurization and other systems; 31. Utilization of the residues from scrubbing and other control systems; 32. Encouraging the use of high efficiency - low emission energy transmission systems (e.g. stoves, boilers, etc.) 33. Minimizing losses and illegal uses in transmission and distribution network for power 34. Promoting the diffusion and efficiency of central heating systems; 35. Wider use of process energy (e.g. co-generation); 36. Technical support for energy efficient technology transfers in industry; 37. Improvement of techniques for energy consumption calculations in buildings; 38. Support the replacement of appliances with low energy efficiency; 39. Organization of fixed and mobile measurement stations; 40. Establishment of energy management systems in enterprises consuming more than 2000 tons petroleum equivalent energy annually; 41. Use of fluidized bed boiler systems in power plants and industries; 42. Facilitating mass transportation 43. Introducing renewable energy sources for energy supply in rural areas;

R & D

- 44. Identification and planning of research priorities in energy field
- 45. Development of techniques and technologies that increase energy efficiency;
- 46. Inventory of carbon emissions;
- 47. Investigating the correlation between emission/air quality, combustion techniques and air pollution abatement measures;
- 48. Research on costs and benefits of improving the quality of domestic coal.

Table A6.5: Options for the Management of Water Resources and Wastewaters

Areas of Action	Options
Policies	1. New policies to protect and manage water basins, aquifers and wetlands, including integrated water resources management.
Institutional Reform	2. Establishment at regional level of "water resources protection and development unions" composed of the representatives of fishermen, farmers, related ministries, local governments, and professional and voluntary organizations; 3. Active representation in all international organizations and arrangements directly or indirectly related to the management of water resources. 4. Transfer of the management of state irrigation schemes to farmers/their organizations
Legislative Arrangements	5. Harmonization of national arrangements with international legislation and agreements; 6. Preparation of "Water Basin Management Regulations" by considering the economic, ecological, social and cultural conditions existing in water basins; 7. Implementation of edict on wastewater collection and treatment; 8. Revise legislation to allow for more private sector involvement in developing and managing water supply and sanitation facilities and services; 9. Enactment of Water Law; 10. Revision of Groundwater Act (No. 167).
Economic & Financial Measures	11. Setting waste water charges according to the characteristics of individual settlement areas; 12. Institutionalizing the practice of Build-Operate-Transfer (BOT) for water supply and treatment; 13. Ensuring the utilization of wastewater charges for improving wastewater management; 14. Raising the rates of taxes/fees in highly sensitive areas for the sustainability of water resources; introduction of new measures when necessary; 15. Linking wastewater discharge standards and fees to quality of the receiving body.
Education-Training	16. Development of programs for households, industrial entrepreneurs and water utilities to ensure the efficient utilization of water resources; 17. Wider practice of reusing domestic and industrial waste water; 18. Initiation of middle level vocational schools for training environment technicians in regions to be identified;
Participation	19. Support to voluntary organizations engaged in activities related to the protection and development of water resources as well as monitoring water quality;
Techniques	20. Development of water quality standards; 21. Design of "Water Quality Maps" and monitoring them; 22. Preparation of an inventory of ground water reserves; 23. Introducing watershed management techniques with decision support systems; 24. Development of standards related to the tools and equipment for measurement, sampling and analysis; 25. Encouragement of the use of the effluents of wastewater treatment facilities in irrigation; 26. Establishment of database on wastewater characteristics; 27. Implementation of water conservation and recycling measures; 28. Application of sustainability standards for groundwater usage.
R & D	29. Identification of "hydraulic basins", "coastal areas", "special protection zones" and "touristic areas" for transition to a basin based management; and remapping of water basins with clear borders; 30. Systematic and regular gathering of data in water basins, in line with EU directives; 31. Development of the concept of "primary pollutants"; 32. Investigating pollution originating from precipitation; 33. Identification of the characteristics of water resources in receiving environments;

Table A6.6: Options for Solid and Hazardous Waste Management

Areas of Action	Options
Policies	<ol style="list-style-type: none"> 1. Emphasis on minimizing, recycling and recovering wastes; 2. Rehabilitation of old waste dumps; 3. Emphasis on sanitary landfills & hazardous waste treatment.
Institutional Reform	<ol style="list-style-type: none"> 4. Establishment of "Waste Exchange" at national and regional levels; 5. Formation of "Hazardous Waste Management" units at regional level; 6. Establishment of "Emergency Management Centers"; 7. Establishment of "Waste Management Units" with special budgets within the boundaries of greater municipalities.
Legislative Arrangements	<ol style="list-style-type: none"> 8. Enactment of new regulations on industrial accidents, cases requiring urgent intervention, and hazardous waste transportation; 9. Rearrangement of authority and responsibility sharing among relevant organizations in a coordinated manner, and introduction of a functional division of labor; 10. Development of guidelines for the storage of hazardous wastes; 11. Elimination of inconsistent terms used in relevant legislation; 12. Legal arrangements for introducing eco-labeling; 13. Adherence to international agreements on hazardous waste management; 14. Amend Municipal Revenues Law (No. 2464) to increase cost-sharing for infrastructure investment; 15. Revise legislation to allow for more private sector participation in solid and hazardous waste management; 16. Amend Regulation on Solid Waste Control to increase flexibility in lining standards at sanitary landfills where there is no risk of leaching; 17. Allow municipalities to enforce Hazardous Waste Control Regulation.
Economic & Financial Measures	<ol style="list-style-type: none"> 18. Land allocation and credit for regional resource recovery and waste disposal facilities; 19. Replace Environment Cleansing Tax with inflation-adjusted charges based on the quantity and type of waste generated; 20. Incentives for waste reduction at source; 21. Applying hazardous waste disposal charges to original manufacturers as well as users.
Education -Training	<ol style="list-style-type: none"> 22. Implementation of training programs on hazardous waste management; 23. Training of hospital personnel at all levels; 24. Certification for the information and skill levels of personnel employed in hazardous and medical waste management; 25. Institutionalizing the information flow to the public; 26. Implementation of training programs to encourage the wider use of "eco-packaging".
Participation	<ol style="list-style-type: none"> 27. Support to voluntary organizations in their monitoring and project based activities; 28. Conduct of regional referendums on the collection, dumping and elimination of hazardous wastes; 29. Encouragement of persons and organizations who reduce waste at the source.
Techniques	<ol style="list-style-type: none"> 30. Establishment of waste processing and disposal facilities equipped with appropriate technologies; 31. Support for waste producers to introduce waste minimization (including packaging), recycling and disposal systems; 32. Enlarging the scope of waste inventories and ensuring their sustenance; 33. Supporting the establishment of integrated (reuse+elimination) waste processing facilities; 34. Preparation of programs for the improvement of polluted areas; 35. Updating of topographic maps and aerial photographs; 36. Developing standards for recycled products; 37. Inclusion of hazardous waste management in urban development plans; 38. Wider observance in public and private industries of the principles of ISO 14000, Ecotex, and Triple Responsibility; 39. Encouragement of "environment friendly" production and consumption; 40. Preparation of "Waste Management Plans" by producers in sensitive receiving environments; 41. Support infrastructure for the collection, transport and elimination of medical waste; 42. Preparation of standards for collection tanks, transport vehicles, transfer stations, dumping sites and elimination facilities 43. Development of standards for transportation and temporary storage of hazardous wastes.

R & D	<ul style="list-style-type: none"> 44. Further enrichment of waste processing options; 45. Establishment of a "Processing Development Center" for reducing wastes; 46. Wider support to the R & D work of industrial enterprises in the field of waste management; 47. Inventory of areas polluted by wastes; 48. Identification of waste dumping sites fit for urban settlements; 49. Development of technologies for the dumping, transport and elimination of medical wastes; 50. Identification of ecosystems affected by dumpsite leachate; 51. Preparation of a "Glossary of Waste Management Terms"; 52. Develop transparent criteria for sanitary landfill site selection.
------------------	---

Table A6.7: Options for the Prevention of Noise Pollution

Areas of Action	Options
Policies	1. Identification of areas with a noise level of more than 55-65 dBA; resorting to policies of population reduction and discouragement of new settlements;
Institutional Reform	2. Supplementing the equipment of relevant organizations for noise measurement; 3. Establishment of an Acoustic Monitoring Committee; 4. Establishment of special noise consultancy units authorized to issue licenses; 5. Formation of "noise supervision" units in local governments and their coordination with "Noise Pollution Teams" of Governorates; 6. Empowering the supervision functions of engineering, architectural and other professional organizations, and supporting such organizations with adequate devices; 7. Formation of the National Noise Pollution Coordination Committee
Legislative Arrangements	8. Revising and updating the Noise Control Regulation (NCR); 9. Preparation of explanatory circulars to widen the scope of implementation of the Noise Control Regulation ; 10. Ensuring the implementation of sanctions put by the NCR; 11. Timely evaluation of violations of the NCR; 12. Introduction of sanctions to the Urban Development Regulation to reduce external and internal noises.
Economic & Financial Measures	13. Charging higher fees for airplanes that have high noise technologies; 14. Introduction of noise indemnities; 15. Timely collection of fines; 16. Increase of fines on noise in proportion with the persistence and degree; 17. Encouragement of the production and transfer of low noise technologies; 18. Imposing taxes on construction, industrial enterprises and recreational facilities that generate noise above certain limits; 19. Instituting a "Noise prevention Share" in taxes for motor vehicles (or in taxes on fuel consumption).
Education-Training	20. Extension activities for preventing or avoiding noise; 21. Organization of applied training in enterprises; 22. Preparation of a "Glossary of Noise Terms"
Participation	23. Encouraging consumers to use low-noise level instruments and appliances; 24. Giving priority to the evaluation of consumer complaints on noise; 25. Support to voluntary organizations in their monitoring of the origins and levels of noise.
Techniques	26. Planning traffic flows so as to minimize noise originating from mass transportation; 27. Preparation of noise maps; 28. Inclusion of noise measurements in vehicle inspections; 29. Performance and licensing of headphone tests; 30. Formation of "Noise Prevention Zones" in areas around highways and industrial enterprises; 31. Design of transportation planning in conformity with the NCR; 32. Development of vibration standards specific to heavy vehicles, locomotives, planes, heavy industrial machines, etc.
R & D	33. Development of technologies for the prevention of noise and vibration generated by the working of mechanical systems; 34. Development of technologies and techniques that minimize noise originating from aerial, land, and maritime transportation; 35. Identification of measures such as shielding, changing of topography, sound and vibration isolation etc.; 36. Technologies for ear protection; 37. Development of noise-preventing technologies; 38. Checking whether noise and vibration limit values are meaningful and realistic; 39. Formation of the data base required by noise pollution analyses in the EIA

Natural Resource Management

Table A6.8: Options for the Protection and Management of Land/Soil Resources

Areas of Action	Options
Policies	<ol style="list-style-type: none"> 1. Diffusion and planning of rural development policies 2. Agricultural support policies integrated with efforts to preserve land resources 3. Preparation of action plans for the prevention of soil erosion, desertification and pollution, especially in the GAP region; 4. Using soils according to their suitability classification
Institutional Reform	<ol style="list-style-type: none"> 5. Reorganization of the central and peripheral units of the Ministry of Agriculture and Rural Services and the Ministry of Forestry 6. Making public research agencies and routine analysis laboratories more efficient and effective 7. Ensuring that the service delivery by the General Directorate of Rural Services is carried out by a separate organization than those in charge of research, data collection and training 8. Formation of basin management units and executive boards 9. Rearrangement of the rights, duties and responsibilities of the Union of Chambers of Agriculture 10. Redefinition of the rights, authority and responsibilities of village administrations; strengthening of village unions; democratization of administration 11. Preparation of soil conservation and land improvement action plans at the regional level 12. Establishment of a unit in charge of research, control of techniques and equipment as well as calibration of equipment which are used for agricultural combat.
Legislative Arrangements	<ol style="list-style-type: none"> 13. Amendment of Articles 44 and 45 of the Constitution; 14. Enactment of Soil Conservation and Land Improvement Laws; 15. Enactment of Regulation on the Control of Soil Pollution; 16. Revision of Acts nos. 4070, 4071, and 4072 17. Revision of the Act on Cooperatives; 18. Updating of the Village Act; 19. Revision of the articles of the Land Act and Civil Code that permit the fragmentation and non-agricultural use of agricultural lands; 20. Revising the Act on Mining to ensure that mining enterprises prepare and implement land rehabilitation programs after their extraction activities; 21. Revising the institutional laws of the DSI, GDA, and GDRS to permit integrated work at the catchment basin level
Economic & Financial Measures	<ol style="list-style-type: none"> 22. Ensuring farmers' contribution to land improvement investments 23. Seeking the contribution of mining industries for land rehabilitation 24. Charging land improvement fees to polluters 25. Ensuring that monetary incentives introduced by Act no. 4122 are first channeled to soil conservation and land improvement works in water catchments 26. Reconsideration of incentives for pesticide use.
Education-Training	<ol style="list-style-type: none"> 27. Development and wider use of soil conservation related in-service training programs in related public organizations and agencies 28. Giving soil conservancy and land improvement training to village group technicians 29. Support to professional and voluntary organizations in their activities for soil conservation and land improvement 30. Diffusion of extension activities in line with the cultural and social conditions of the region concerned; conduct of joint training programs with farmers; implementation of advanced techniques 31. Attachment of extension units to research institutes; coordinated work performance of research-extension-agricultural combat units
Participation	<ol style="list-style-type: none"> 32. Institutionalization of cooperation between the related ministries and professional and voluntary organizations 33. Participation of the farmers of a region in the planning and implementation of integrated eco-basin management plans by exercising specific rights and undertaking duties and responsibilities 34. Strengthening of the committee stipulated by the Regulation on Pesticide Licenses with specialists from different fields

Techniques	<ul style="list-style-type: none"> 35. Establishment and use of remote sensing/geographical information systems; 36. Diffusion of land compacting works; 37. Expansion of the scope of EIA to cover the assessment of the infrastructure investments of public organizations; 38. Monitoring and supervision of land and agricultural input use 39. Expansion of the scope of EIA to cover the issue of non-agricultural use of agricultural lands 40. Limitation of area under tobacco cultivation; 41. Control of the use of phosphorous fertilizers; 42. Preparation and implementation of programs designed for the encouragement of integrated pest management; establishment of early warning schemes; 43. Inspection of agricultural pesticide producers and dealers; 44. Expansion of fodder crop culture; 45. Control of the importation and use of hormones and carcinogenic substances; 46. Abandonment of the practice of fallow with the exception of localities where this practice is scientifically proven as necessary 47. Elimination of differing practices in the field of chemical residue limits
R & D	<ul style="list-style-type: none"> 48. Updating land capacity classifications; 49. Identification of tilling techniques and the methods of agricultural inputs (water, fertilizers and pesticides) with respect to land characteristics and local levels not to harm soils and development of environmentally friendly technologies; 50. Supervision of the producers of agricultural pesticides and equipment 51. Identification of fertilizer compositions suitable to local conditions and environmental impacts of fertilizers specific to locations 52. Development of techniques in order to use drainage water for irrigation purposes.

Table A6.9: Options for Forest Management and Protection of the Vegetative Cover

Areas of Action	Options
Policies	<ol style="list-style-type: none"> 1. Giving priority to the development of villages settled in or near forests; 2. Determination of the purposes of utilizing areas considered as "forest" at national and regional levels and as specific forest ecosystems 3. Revision of forestry sector policies and plans 4. Redefining "public benefit" concept in the legislation.
Institutional Reform	<ol style="list-style-type: none"> 5. Reorganization of the Ministry of Forestry; 6. Resizing and transformation of the State Forestry Enterprises to autonomous structures based upon fields of expertise in order to ensure the functional and local integrity of forest services; 7. Modification of the expert personnel composition of forest cadastry and forest management commissions to conform with the requirements of the science of forestry; 8. Introduction of semi-autonomous management structures for national and natural parks to facilitate the participation of local people in decision-making mechanisms.
Legislative Arrangements	<ol style="list-style-type: none"> 9. Revision of Articles 169 and 170 of the Constitution; 10. Revision of Act no. 6831, particularly Articles 1, 7-11, 16,17, 18, 52 and 57. 11. Amendment of Article 8 of Act no. 2873 on National parks; 12. Revision of Act no. 2924 on the Support to the Development of Forest Villages; 13. Prevention of the practice of conducting forest cadastry under the Cadastry Act no. 3402; 14. Rearrangement of Article 8 of the Act no. 2634 on Incentives to Tourism; 15. Enactment of Law on Ranges; 16. Making arrangements for the allocation of at least 5 % of the territory of each province as a "natural reserve area"; 17. Legal arrangements for furnishing forest villagers with social security benefits; 18. Updating Game Law.
Economic & Financial Measures	<ol style="list-style-type: none"> 19. Increasing revenues of the funds for Afforestation, Forest Villages Development, and National parks; 20. Increasing the general budget share of afforestation and forest conservancy works ; 21. Implementing the monetary sanctions of Act no. 4122 on National Mobilization for Afforestation and Erosion Control; 22. Corporate tax exemption for the state forestry enterprises 23. Enabling financial support for projects on harvesting aquaproducts and forest by-products for promoting development of forest villages 24. Encouragement of forestry personnel by rewarding good practices..
Education-Training	<ol style="list-style-type: none"> 25. Updating higher education in forestry and making it more relevant to the existing realities in the field of forestry; 26. Introducing vocational programs at middle level education; 27. Initiation of training centers for forestry workers to conduct area-specific training activities; 28. Development and implementation of in-service training programs in the attached organizations of the Ministry of Forestry to provide information on regional forestry conditions.
Participation	<ol style="list-style-type: none"> 29. Form a unit to promote stakeholder participation in the processes of decision making on the conservation, expansion and improvement of forests; 30. Strengthening the public relations units of related organizations; 31. Endowment of the forest village development cooperatives with relevant rights, duties and responsibilities to cooperate with the State as stipulated in Article 170 of the Constitution; 32. Raising awareness and ensuring the participation of local people in activities for the in-situ protection of plant gene resources by supporting them with economic incentives.

Techniques	<ul style="list-style-type: none"> 33. Formation of a multi-dimensional forestry data base; 34. Production and mapping of information on "growth habitat" within the scope of forest inventory work; 35. Arrangement of forestry management plans in time and in line with the principle of multi-purpose utilization of forests; 36. Wider utilization of techniques to manage forest pests; 37. Institutionalization of EIA for investments in afforestation, road construction, etc. and introduction of biodiversity considerations, socio-economic assessments, and green accounting concepts into EIA procedures; 38. Equipping relevant units with assessment, monitoring and mapping devices to facilitate the observation of changes in the quality and quantity of forests through geographical information systems; 39. Development of techniques to prevent any damage to important plant species during pest control; 40. Supply and demand management of wood as a raw material 41. Development of pilot projects on harvesting aquaproducts and forest by-products for promoting development of forest villages.
R & D	<ul style="list-style-type: none"> 42. Preparation of seed improvement programs; 43. Risk classification and mapping for forest fires together with relevant risk studies; 44. An inventory of insects and fungi that exert harmful influences on forests; 45. Monitoring of the effects of acid rain in Western Black Sea and Western Anatolia; 46. An inventory of environments and entities that have the characteristics of "nature preserve", "natural park", and "natural monument"; 47. Implementation of programs for finalizing species inventory basing upon the new classification developed by the IUCN; 48. Development of functional classification maps for forest; 49. Development and application of performance measures for sustainable forest management.

Marine and Coastal Resources

Table A6.10: Options for Managing Marine Resources, Coastal Zones and Other Sensitive Environments

Areas of Action	Options
Policies	<ol style="list-style-type: none"> 1. Inclusion in environmental protection policies of the approach of considering wetlands, mountains, highlands and coasts each as an ecosystem by itself; 2. Coverage of plateaus, mountains and sand dunes in special preservation areas, and in natural site identification and management mechanisms; 3. Elimination of clashing in the sharing of authority and responsibility in matters related to development in sensitive environments. 4. Development of policies to prevent the harmful impacts of tourism activities on marine ecosystems; 5. Support for artisanal fishing; 6. Develop new sanctions on cargo ship traffic and accidents in the Bosphorus; 7. Protecting sprawling and nursery ground and zones for aquaculture 8. Prevention of marine species which have high economic and nutrition value from being used as animal feed.
Institutional Reform	<ol style="list-style-type: none"> 9. Formation of "preservation committees" with the representatives of local governments, voluntary organizations and universities at national and regional levels. 10. Establishment of a National Fishing Committee; 11. Active representation in all international organizations and arrangements directly or indirectly related to the management of marine issues; 12. Establishment of laboratories for quality control of aquaproducts
Legislative Arrangements	<ol style="list-style-type: none"> 13. Introduction of legislative arrangements specific to sensitive environments; 14. Modification of the Act no. 3621 on Shores and the related Regulation; definition of the term "coastal strip" with regard to the characteristics of the strip involved; 15. Imposing regional fishing and hunting quotas; 16. Giving a new content to acts on Forestry, Mines, Coastal Areas and Water products so as to ensure their support to preservation efforts for species and special environments; 17. Removing DSI's mandate to drain wetlands as a malaria control technique.
Economic & Financial Mechanisms	<ol style="list-style-type: none"> 18. Taxing linked to sensitive environments. 19. Supporting the breeding of rare and endemic species under the threat of extinction;
Education-Training	<ol style="list-style-type: none"> 20. Equip voluntary organizations with necessary training materials; 21. Training of the managers and personnel of investment-making governmental organizations and other organizations involved in mass housing and infrastructure investments; 22. Training of village headmen, village elders committees and municipal authorities.
Participation	<ol style="list-style-type: none"> 23. Enhancement of the rights, duties and responsibilities and endowment of village administrations on the preservation of highlands, mountains and wetlands; 24. Allowing management of specific sensitive environments by voluntary organizations.
Techniques	<ol style="list-style-type: none"> 25. Preparing an inventory of sensitive environments; 26. Preparing an inventory of geologic and geomorphologic formations at coastal zones and developing protection measures; 27. Preparing an inventory of live marine resources/aquaproducts 28. Measures for the protection of micro and macro flora and fauna specific to sand dunes during construction on coastal dunes and dune control works; 29. Preparation of integrated "Sensitive Area Management Plans" based on ecological, economic, social and cultural analyses; 30. Formation of a fishing stock market; 31. Following international fishing techniques and technologies; 32. Identification and mapping of fishing areas; 33. Development of standards on the quality and quantity of feed used in hatcheries; 34. Supervision of the use of water products, fish in the first place, for making animal feed; 35. Performance of weeding activities in dams without causing any environmental harm; 36. Use of fish specialists to combat fish diseases in inland water fishing; 37. Improving safety and management of vessels traveling through the Bosphorus and Dardanelles Straits.

R & D

38. Enrichment of information on the ecological characteristics of sensitive environments with the contribution of different disciplines;
39. Delineation of coastal zones.
40. Identification of the optimum size of fishing fleets (number of vessels, engine and fishing power, etc.);
41. Identification and mapping of areas with high productivity (breeding and development);
42. Identification of areas where fishing has to be practiced under supervision;
43. Preparation of emergency preparedness plans for straits and seas.

Cultural and Natural Heritage Sites

Table A6.11: Options for the Management of Historical, Cultural and Natural Entities

Areas of Action	Options
Policies	1. Joint responsibility for protection with the private sector.
Institutional Reform	2. Organization of bodies to identify historical, cultural and aesthetic assets at national and regional levels; 3. Introduction of preservation departments in universities; inclusion of "preservation economics" in the curricula; 4. Modification of the composition of the Higher Council for the preservation of Cultural and Natural Assets and Regional Committees, and their transformation into autonomous structures; 5. Developing mechanism to coordinate organizations responsible for various aspects of preservation;
Legislative Arrangements	6. Revision of relevant legislative arrangements with respect to actual requirements; 7. Standardization of criteria used by different organizations for the identification and registration of historical, cultural and natural assets;
Economic & Financial Measures	8. Increasing financial support for preservation purposes, e.g. through higher entrance fees; 9. Transfer greater percentage of revenues to preservation sites and projects; 10. Introduction of higher and broader taxes and duties; 11. Utilization of exhibition revenues only for research, preservation and presentation activities; 12. Application of a separate tax on urban development rents, and particularly on earnings from the exercise of development rights at the expense of the demolition of historical structures;
Education-Training	13. Inclusion of the topic of preservation in primary-middle school curricula; 14. Organization of special public activities such as preservation "years", "weeks", "days", etc.; 15. Development of skilled labor needed for implementing preservation projects.
Participation	16. Organization of people's participation to the process of legislative arrangements; 17. Supporting voluntary organizations to participate to the preservation activities in their regions,
Techniques	18. Awards and other support for research and preservation activities; 19. "Barter" arrangements; 20. Intensification of mapping work and enhancing access to maps; 21. Development of the processes of preparing and implementing preservation plans; 22. Preparation of a cultural and historical assets inventory and an atlas; their updating in specific times and enhancing access to such sources; 23. Multi-faceted preparation of the management plans of national parks, natural parks and nature conservation areas.
R & D	24. Speeding up work by universities, foundations, research centers and institutes for the identification and disclosure of assets; 25. Definition of related concepts and terms; preparation of a glossary

ANNEX 7

Investment Briefs

Table A7.1: Studies and Projects for Enhancing the Current Environmental Management System

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
-----------------	--------------------	--	--

<p>1.1: Harmonizing Institutional Authority & Procedures</p>	<p>Justification: In Turkey, many organizations carry out various activities directly or indirectly related to the protection and development of the environment. There are contrasts and redundancies in the objectives, scopes, techniques, principles, instruments, and timing of these activities. Identification of all aspects of these activities in a comparative way is essential for introducing an effective environmental management system and for avoiding waste of resources.</p> <p>Scope: Identification of the activities carried out by relevant ministries, their attached organizations, universities, private sector, professional organizations and voluntary organizations in terms of their subjects, objectives, scopes, methods, resources, space, and time horizons; examining their functional integrity, effectiveness, efficiency, problems, outputs, and outcomes; recommending changes to harmonize institutional activities.</p>	<p><u>Implementers</u> 1) Prime Ministry 2) Ministry of Environment 3) SPO</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Relevant Ministries • Local governments • Parastatals • Universities • NGOs 	<p>Estimated cost: <u>Under \$5 million</u></p> <p>Time horizon: SHORT TERM</p>
<p>1.2: Harmonizing the Legislative Framework</p>	<p>Justification: There is an abundance of legislation directly or indirectly related to the protection and management of the environment. These arrangements lead to clashes of authority and responsibility among organizations because they were put into effect at different times, for different reasons and without much reference to each other. These legislative arrangements may also lead directly or indirectly to other problems because of their outdated nature or contradictory sanctions. In general, this setting creates an ambiguous situation where there may be duplication of authority and effort, violators of environmental rules can evade the law and enforcement may not be taken seriously.</p> <p>Scope: The analysis would cover: articles nos. 43, 44, 45, 46, 47, 50, 56, 63, 72, 125, 127, 133, 166, 169, 170, 171 and 172 of the Constitution; Acts presently in effect including those on Environment, Forests, National Parks, Game, Public Works, Coastal Zones, Mining, Tourism, Culture, Preservation of Natural Assets, General Hygiene, Municipalities, Civil Code, Taxation; institutional laws; and related regulations, by-laws, circulars. The comparative analysis would cover their objectives, subjects, incentives, disincentives, sanctions, terminology used, institutional requirements, estimated costs of implementation, and relative effectiveness. Finally, recommendations would be prepared for harmonizing existing legislation, including recommended wording for constitutional, legal and regulatory amendments.</p>	<p><u>Implementers</u> 1) Prime Ministry 2) Ministry of Environment 3) SPO</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Relevant Ministries • Parastatals • Local governments • Professional orgs. • Universities • NGOs 	<p>Estimated cost: <u>Under \$5 million</u></p> <p>Time horizon: SHORT TERM</p>

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
1.3: Identifying Eco-basins	<p>Justification: Both in Environment Councils and in the SFYDP and the project of Basic Structural Change for the protection and Management of the Environment, the approach adopted envisages the establishment of a system of environmental management on based on "eco-basins" that display integrity in their ecological characteristics. However, in Turkey there is still no clarity as to how to identify these basins; what variables and criteria are to be used in this identification; what organizations will be in charge and by using that methods and techniques; the ways of acquiring or procuring these techniques; who will derive the data base necessary in identification work and how; the working of decision making processes for managing identified basins, etc. Thus, these questions must be answered in detail at this stage of the work.</p> <p>Scope: All kinds of natural factors that affect the capacity of water, soil plant cover and fauna to qualitatively and quantitatively sustain themselves and their functions in eco-systems will be taken as a base; economic, social and cultural structures and their processes of change will also be taken into consideration; pilot management schemes will be tried.</p>	<p><u>Implementers</u></p> <ol style="list-style-type: none"> 1) Ministry of Forestry 2) MARA 3) DSI <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • ME • SPO • GDOF • GDRS • Administration of Electricity Surveys • Universities • Local Governments • NGOs 	<p>Estimated Cost: <u>\$5-25 million</u></p> <p>Time Horizon: SHORT TERM</p>

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
1.4: Local Environmental Action Planning	<p>Justification: One of the key managerial problems identified in Chapter IV is that many environmental problems occur at the local level but, because of over-centralization, cannot be solved locally. One remedy for this situation is to empower local authorities through preparation and implementation of local environmental action plans (LEAPs). According to a 1996 survey, over 1800 local governments in 64 countries are preparing LEAPs, also known as Local Agenda 21 planning; in Turkey, only three such initiatives are under way (ICLEI, 1997).</p> <p>Scope: The LEAP process involves: (a) informed consultation in which rapid assessments are conducted, environmental issues are clarified, key stakeholders are involved, political commitment is achieved, and priorities are set through an informed consultative process; (b) formulation of an integrated local environmental management strategy with long-term goals and phased targets for meeting the goals and actor-specific action plans that cur across various issues; and (c) implementation and monitoring of programs, projects, policies, and institutional reforms. LEAP development and implementation would be supported in a range of large, medium and small municipalities.</p>	<p><u>Implementers</u> Local governments</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Ministries of Interior, Public Works, Forestry & Health • Municipal unions • NGOs • Universities • Research institutes • Private sector • Bank of Provinces • UNDP 	<p>Estimated Cost: <u>\$5 - 25 million</u></p> <p>Time Horizon: SHORT TERM</p>
1.5: Making the EIA Process More Effective	<p>Justification: In Turkey, the EIA practices have not been institutionalized in spite requirements in the Environment Act and the "Regulation on Environmental Impact Assessment" put into effect in 1993. The data base and conceptual framework for the EIA have not been established; awareness about the EIA is low in public enterprises, the private sector and local governments; effective public participation in the EIA process has not been ensured; and there is no mechanism to certify qualified organizations and individuals who can prepare EIA documents. Consequently, the EIA is not an inherent part of investment decisions. This situation makes it difficult to prevent and mitigate environmental problems.</p> <p>Scope: Improving the EIA process through use of scoping and development of sectoral forms/formats; creation of awareness about EIA process through EIA training program for public enterprises and information campaign for private sector; improved dissemination of draft EIA reports to stimulate more public participation; professionalization of EIA preparation through creation of a certification process; development of monitoring and enforcement program to ensure that mitigation measures are being carried out; increased use of environmental database (see Project 2.2 below).</p>	<p><u>Implementers</u> Ministry of Environment</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Related Ministries • Public enterprises • SIS • Private sector • Universities • NGOs 	<p>Estimated cost: <u>Under \$5 million</u></p> <p>Time horizon: SHORT TERM</p>

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
1.6: Classifying and Planning Land Use Capacity	<p>Justification: In Turkey, the only data base that includes information on the structural properties of land comes from an outdated survey started by TOPRAKSU in the 1960s and completed in 1971 (Advanced Land Map Surveys for Turkey). It is necessary to update this work with advanced techniques. Data on the actual forms of land use is limited to regional observations and the techniques used are not fit for making analysis. Land use plans based upon the capacity classification of land do not cover the whole country. As a result, utilization of land in terms of its capacity, and work related to soil conservation and land rehabilitation can not be based upon eco-basins. For the same reasons, agricultural production planning is difficult; land concentration, establishment of irrigation schemes and infrastructure investments cannot be based on environmental information.</p> <p>Scope: Identification of present capacity classification of land and land use patterns by making use of the techniques of remote sensing and geographic information systems; preparation of land use plans; development of an institutional model and relevant legislative frame for ensuring the use of land in conformity with the objectives of these plans.</p>	<p><u>Implementers</u> General Directorate of Rural Services</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Ministries of Agriculture, Public Works, Forestry, Environment, Energy & Natural Resources) • DSI • SIS • GDAR • Universities 	<p>Estimated cost: <u>\$5 - 25 million</u></p> <p>Time horizon: MEDIUM TERM</p>
1.7: Completing and Managing Rural Cadastral Works	<p>Justification: In Turkey, rural cadastral works have not been completed. Boundaries of state forests, ranges, treasury lands, and in some cases private lands are not clearly drawn so as to be legally valid. This situation negatively affects especially the management of areas defined as "state forests" and ranges, and leads to clashes in rural areas. Meanwhile, there is a conflict in terms of functions, authority and responsibility for preparing rural cadastral works. Bodies endowed with personnel of varying qualifications and origins can conduct the cadastral works for forests, ranges and other lands. This problem is exacerbated by lack of up-to-date information on land capacity classification and absence of land use plans based upon capacity classifications (see Project 1.4).</p> <p>Scope: Delineation of the boundaries of "state forests", ranges, Treasury lands, private farming plots, etc. by using advanced techniques and developing new organization models; maintaining such information to allow for computer based processing; mapping at proper scales and forms; monitoring and updating on a regular basis; improved government and public access to such information; identification of priority areas to initiate this work and preparation of relevant work plans.</p>	<p><u>Implementers</u> Cadastry General Directorate</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Ministries of Agriculture, Forestry, Treasury & Interior • GDAR • Union of the Chambers of Agriculture • Private sector 	<p>Estimated cost: <u>\$5 - 25 million</u></p> <p>Time horizon: MEDIUM TERM</p>

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
1.8: Preparing and Implementing National Productivity Action Plans	<p>Justification: Inefficient utilization of resources is a leading cause of environmental problems. Furthermore, inefficient use of resources also limits what can be used for the protection and management of the environment. The problem of low efficiency that can be observed at various levels in all spheres of life. However, the reasons that lead to low efficiency are known only generally and only for some areas in Turkey. Also, the problem is addressed only in its technical and economic dimensions. There is no systematic work to solve the problem. It is therefore necessary to assess the level of efficiency; identify the causes of low efficiency; and to design and implement action plans and programs aimed at raising efficiency.</p> <p>Scope: Formation of updated data base on the quality and quantity of resources in the fields of energy production and consumption, water, land, forests, and ranges; identification of ecological constraints on resources and social demand for such resources in a comparative way; development of techniques for meeting ecological and social needs in a sustainable manner; preparation and implementation of action plans, programs, and policies for raising efficiency.</p>	<p><u>Implementers</u></p> <ol style="list-style-type: none"> 1) SPO 2) National Productivity Center <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Relevant Ministries • Universities • Private sector • NGOs • R & D agencies 	<p>Estimated cost:</p> <p><u>Under \$5 million</u></p> <p>Time horizon:</p> <p>MEDIUM TERM</p>

Table A7.2: Projects for Enhancing Information and Awareness

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
<p>2.1: Managing Environmental Data</p>	<p>Justification: While SIS has created an “Environmental Statistics” unit, there is not yet an integrated environmental database that can be accessed and used by decision-makers and the general public. Other relevant organizations (e.g. DSI, Bank of Provinces) maintain databases only for their own use. Institutions that gather environmental data develop their own monitoring and recording systems that are not compatible with each other. Decision-makers and analysts lack needed data or face a situation where data obtained from different sources is conflicting.</p> <p>Scope: The objective is to integrate and evaluate environmental data in each institution and open it to use by decision-makers, professionals and the public. Environmental laboratories will be established for regional groupings of provinces in order to monitor pollution and the state of the environment. Common standards for collecting environmental data will be developed; data will be compiled and presented in a dynamic database; an MIS will be developed for accessibility by relevant ministries, regional offices of related agencies and local environmental boards; summary environmental data will be made available to the public through a Web site and published reports.</p>	<p><u>Implementers</u> State Institute of Statistics</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • DSI • Bank of Provinces • SPO • LECs • Local governments • Universities • NGOs • R & D agencies 	<p>Estimated cost: <u>\$26-50 million</u></p> <p>Time horizon: MEDIUM TERM</p>
<p>2.2: Environmental and Training Education</p>	<p>Justification: In Turkey, education and training for environmental protection and management is primarily on an ad hoc basis. In terms of content, sound information and techniques are often not used. Information required by the social and cultural characteristics of the target audiences has not been adequately produced, especially in adult education; educational curricula and materials have not been developed; and those who conduct adult training have not been equipped with relevant training materials. These deprivations may lead to the spread of incomplete and in some cases even erroneous information and lower the effectiveness of training. Consequently, the concerns and awareness of people about environmental issues remains low.</p> <p>Scope: Raising awareness about regional environmental factors and their significance, and then on regional, national and universal environmental issues by considering i) the age, gender, social identity, education and cultural characteristics of individuals; and ii) differences in the form, function and level of effectiveness of organizations; developing information on the techniques of preventing, managing and solving environmental problems; creating awareness about opportunities for public participation in prevention and management activities; diffusion and institutionalization of pilot efforts; introduction of mechanisms for regular training of trainers.</p>	<p><u>Implementers</u> 1) ME 2) Ministry of Education</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Related Ministries • Private sector • NGOs • Universities 	<p>Estimated cost: <u>\$5 - 25 million</u></p> <p>Time horizon: SHORT TERM</p>

Table A7.3: Investing in Improved Environmental Management

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
3.1: Improving Waste Management	<p>Justification: Appropriate waste management was the focus of a detailed study prepared for the ME, METAP and the World Bank at the end of 1995. Two broad sets of problems need to be solved to improve waste management: shortfalls and constraints within institutional, legislative and financial systems; and limitations stemming from the operation of waste management. The latter includes, lack of cost-effective service provision, inadequate standards for waste disposal, limited infrastructure and information, constraints on private sector involvement, and little formal sector involvement in waste reduction.</p> <p>Scope: The project consists of four components. The national component involves creating a National Solid Waste Control Department and funding program to support waste minimization, recycling, hazardous waste management, landfill creation and management, dump site rehabilitation, institutional development, and improved collection services. The municipal component would help local governments improve revenue generation, implement performance indicators and reorganize their solid waste function. The regional/private sector component would seek to create a regional approach to waste management with greater participation by the private sector, especially for hazardous waste treatment and disposal. The technology development component consists of support for appropriate technological options as well as a capacity-building program. Demonstrations projects are also planned.</p>	<p><u>Implementers</u></p> <p>1) ME 2) Local governments</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Ministries of Health, Industry and Trade, Tourism, Education, Public Works, Energy, Defense, Forestry • SIS • Privatization Admin • Bank of Provinces • Private sector • Universities • STRIT • NGOs 	<p>Estimated cost: <u>Over \$50 million</u></p> <p>Time horizon: SHORT TERM</p>

Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
3.2: Encouraging Technologies and Energy Sources Clean Energy	<p>Justification: International experience has shown that it is more expensive to clean up waste at the end of a process than to prevent or minimize it at the source. The use of inefficient industrial technologies creates excess air pollution, wastewater and solid waste that result in a range of environmental harms. Combustion of low-quality and polluting fuels is the major cause of air pollution with its associated health, economic and ecological costs. Encouraging cleaner technologies and energy use will not only reduce pollution; it should also increase the competitiveness of Turkish industry by raising productivity and helping the country comply with EU and other standards.</p> <p>Scope: Modification of regulatory controls to favor cleaner production over end-of-pipe treatment; creation of economic incentives to accelerate the introduction of modern, cleaner technologies and fuels, especially through organized industrial estates; development of a system of private sector auditors to assist industries in identifying cost-effective opportunities for technological upgrading, fuel substitution and energy, water and other resource conservation; creation of an evaluation system that ranks industries according to their environmental performance; technical assistance for small and medium-sized enterprises; use of government purchasing to create demand for environmentally friendly products</p>	<p><u>Implementers</u></p> <ol style="list-style-type: none"> 1) Ministry of Industry & Trade 2) Ministry of Energy & Nat. Resources <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • ME • Private sector • TUBITAK • Privatization Administration • DSI • Local governments • Universities • NGOs 	<p>Estimated cost: <u>Over \$50 million</u></p> <p>Time horizon: MEDIUM TERM</p>
3.3: Upgrading Urban Slums	<p>Justification: Nearly half of Turkey's urban population lives in illegal settlements. Many of these are plagued by: inadequate and unreliable environmental services (water, sanitation, waste collection, drainage); greater exposure to man-made hazards; and increased risk from natural disasters because of poor housing construction and location. This problem is caused by a combination of factors including inadequate supply of affordable housing, institutional constraints that make it difficult to recognize and serve illegal areas, land speculation, and insufficient local government resources.</p> <p>Scope: Remove institutional barriers that make it difficult to provide services to homes and businesses in illegal areas; accelerate the land tenuring process in cities; create integrated service centers in gecekondu to improve access to and delivery of services; rationalize slum road networks to facilitate infrastructure provision; accelerate transfer and/or sale of Treasury land to increase the supply of formal urban land; lower or spread out the costs of accessing services.</p>	<p><u>Implementers</u></p> <ol style="list-style-type: none"> 1) Local governments 2) Ministry of Public Works & Settlements <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> • Treasury • Bank of Provinces • Private sector • NGOs 	<p>Estimated cost: <u>Over \$50 million</u></p> <p>Time horizon: SHORT TERM</p>
Projects	Explanation	Key Implementer(s) & Stakeholders	Estimated Cost & Time Horizon
3.4: Upgrading Environmental Infrastructure Rural	<p>Justification: In Turkey there are about 37,000 villages. In many of these settlements facilities such as sanitation, drinking water, drainage, and sanitary collection of domestic and animal waste are missing or inadequate. The structure of rural dwellings makes it difficult to use heating and cooking energy in an efficient way. Low levels of education and income on the part of farmers, limited resources for meeting the infrastructure needs of villages and the insufficiency of the existing law on villages make the solution of these problems impossible. Consequently, much of the rural 40% of the population lives in improper environmental conditions and faces various health problems.</p> <p>Scope: Identification of the quality, sufficiency and requirements of the existing infrastructure facilities in rural settlements; development of investment and organizational models to meet requirements; identification of the investment fields in priority areas; making an inventory of personnel, tools and materials endowment of investing public enterprises ; implementation of priority investments and programs.</p>	<p><u>Implementers</u></p> <p>General Directorate of Rural Services</p> <p><u>Stakeholders</u></p> <ul style="list-style-type: none"> •Ministry of Public Works & Settlements •Local governments •Special provincial administrations •GDF •GAP Administrat. •Bank of Provinces 	<p>Estimated cost: <u>Over \$50 million</u></p> <p>Time horizon: MEDIUM TERM</p>

<p>3.5: Improving Management of Coastal Zones</p>	<p>Justification: In Turkey, sea and lake shores add up to a total of 10,000 km. About one third of the population of Turkey is settled on shores. Industrial and domestic wastes are mostly discharged to sea either directly or indirectly. Land-based pollution stemming from construction and settlements has led to the loss of living eco-systems in the Marmara and Black Seas, and in many lakes. Tourism-related construction and settlements especially along shores have adverse impacts on coastal eco-systems. Coastal management legislation and its regulations can not provide sufficient basis for efforts to prevent further negative developments and address existing ones. Failure to channel high rents for public benefit makes measures ineffective. In spite of this grim picture, there is still no integrated system that would ensure the proper management of coastal zones.</p> <p>Scope: Identification of the nature, dimensions and origins of environmental problems specific to sea/lake shores and river banks; identification of the authority and responsibility of organizations and agencies that are directly and indirectly related to the prevention and elimination of these problems; their endowments in terms of personnel, materials and equipment; problems they confront doing their work; identification of pertinent legislative arrangements and the scope of programs and projects under implementation; development of democratic mechanisms where the stakeholders who benefit from coastal zones in different ways can participate; introduction of relevant legislative framework for the implementation of these democratic models; imposition of development and clean-up fees for polluters of the coastal zone; support for the preparation and implementation of coastal management action plans and programs.</p>	<p><u>Implementers</u> 1) Ministry of Public Works 2) Local govts.</p> <p><u>Stakeholders</u> •Ministries of Forestry, Agriculture, Health, Environment & Tourism •Special provincial administrations •Private sector •Universities •NGOs</p>	<p>Estimated cost: <u>\$26-50 million</u></p> <p>Time horizon: SHORT TERM</p>
<p>Projects</p>	<p>Explanation</p>	<p>Key Implementer(s) & Stakeholders</p>	<p>Estimated Cost & Time Horizon</p>
<p>3.6: Environmental Management for the GAP Region</p>	<p>Justification: The geographical size, economic, ecological, social, and cultural characteristics of the region; nature and magnitude of investments concerned; and the objectives envisaged makes it absolutely necessary to manage the effects and consequences of the GAP project to avoid new environmental problems. Studies made so far point out that the project will have direct impacts on one tenth of the geographical area of Turkey and affect other regions indirectly. In spite of studies and surveys made or commissioned by the GAP Administration, there is still no coordination of the activities of organizations and agencies working in the region. Limited resources make it impossible to conduct work when it is required. Delays in certain areas spread and sustain the adverse environmental effects of investments. Related organizations and agencies should be coordinated within the framework of a plan in order to minimize such adverse effects.</p> <p>Scope: EIA for investments made under the GAP; preparation of an action plan, work programs and implementation projects to cover mitigation measures for activities that have adverse impacts; mechanisms that will ensure coordination among investing agencies; potential constraints; relevant legislative and institutional arrangements.</p>	<p><u>Implementers</u> GAP Regional Development Administration</p> <p><u>Stakeholders</u> •Ministries of Forestry & Health •Related General Directorates (DSI, GDAR, GDRS, State Highways, etc.) •Local governments •Special provincial administrations •Universities •Private sector •NGOs •UNDP</p>	<p>Estimated cost: <u>Under \$5 million</u></p> <p>Time horizon: SHORT TERM</p>
<p>3.7: Reducing Environmental Risks</p>	<p>Justification: Natural and man-made disasters take a heavy toll in terms of lives, injuries and economic losses. While natural hazards are caused by natural factors, human activities can increase or reduce the impact of earthquakes, floods, landslides, and other catastrophes. Man-made hazards are created by a range of human activities as well as the failure to act properly. Both types of risks can be reduced by investments, information and better management.</p> <p>Scope: Actions to reduce vulnerability to environmental risks should include: programs to raise public awareness, disseminate information and train personnel in appropriate measures; incentives for safer building design and construction for both formal and informal contractors; integration of risk mapping into land use and urban planning; improvements in local drainage; retrofitting schools, hospitals, museums and other prone facilities to protect them from disasters; development of disaster mitigation and emergency preparedness plans for priority communities; selective relocation of households most at risk. Selection of specific areas can be according to the nature of the population and ecosystems at risk, as well as according to international agreements.</p>	<p><u>Implementers</u> 1) Ministry of Public Works & Settlements 2) Local governments</p> <p><u>Stakeholders</u> •Ministries of Defense, Education, Environment, Health •Private sector •Universities •NGOs</p>	<p>Estimated cost: <u>Over \$50 million</u></p> <p>Time horizon: MEDIUM TERM</p>

ANNEX 8

Indicators for Monitoring the NEAP

Indicators are data that show movement towards or away from pre-determined objectives. Environmental indicators are useful for the NEAP in several ways. First, participants in the NEAP process must agree on a set of objectives before indicators can be established. Next, indicators are critical for determining how well policies, programs and investments are in achieving these objectives. Also, indicators can be used to educate decision-makers and the public about both positive and negative changes in the environment. Finally, indicators can form the basis of time-series data on the environment that can be used to identify future problems.

Three sets of indicators can be developed to monitor the NEAP: (a) pressure-state-response; (b) procedural; and (c) policy-based. Pressure-state-response indicators are commonly used to assess environmental quality. Information is collected on the *pressure* that causes an environmental problem (e.g. emissions of particulate matter), the resulting *state* of the environment (e.g. ambient concentrations of particulate matter) and the *response* to the problem (e.g. regulations requiring the use of low-sulfur coal to reduce particulate emissions and ambient air pollution levels). Pressures affect the state of the environment which in turn elicits responses to address those issues.

Procedural indicators have three elements: process, input and output. *Process indicators* provide information on how well procedures are being followed. An example would be the number of environmental impact assessments performed annually per constant unit of GDP. This would indicate whether the EIA process expands (or contracts) with economic change. *Input*

indicators show whether key resources are being used to achieve policy objectives. An example would be annual expenditure on environmental protection and clean-up per constant unit of GDP. This would show whether more (or less) money was being invested in the environment with economic change. *Output indicators* are used to determine whether processes and inputs have a real impact on the environment. An example would be the annual loss of topsoil. This could be used as a partial indicator of how well processes and inputs to prevent soil erosion were succeeding.

The third set of indicators are policy-based. The strategic objectives of an environmental policy are identified. Then, indicators are selected to determine whether the policy is being achieved. These indicators can come from both the pressure-state-response and the procedural set of indicators.

Environmental indicators should have the following characteristics regardless of which set is chosen:

- **Measurable** - indicators should be quantifiable;
- **Policy-based** - indicators should be developed according to policy objectives in order to show whether these objectives are being achieved;
- **Based on existing data** - when possible, indicators should be derived from reliable existing information to speed up their use and minimize costs;
- **Based on a time series** - the same indicator should be collected over a regular interval so that change can be evaluated;
- **Quickly observable** - indicators that can be developed soon after data collection

are more useful than those that require lengthy processing;

- **Widely accepted** - indicators must be understood and accepted by their users;
- **Easy to understand** - indicators should be reported in a simple fashion so that a wide range of people can understand them;
- **Comparable** - indicators should be standardized so that comparisons can be made between regions, programs or countries; and
- **Balanced** - indicators should be politically neutral and allow for measurement of both positive and negative impacts.

Indicators will not collect themselves; a process is needed to gather and analyze indicators. First, a set of policy-based environmental indicators must be agreed upon. Then, an institution must be responsible for collecting, analyzing and reporting on indicators as part of a process of monitoring and evaluation. Analysis and reporting can take many forms and is often being assisted through the use of tools such as geographic information systems. The intermediate goal of monitoring and evaluation should be to update and improve implementation of the NEAP. The ultimate goal should be an improvement in environmental quality.

Policy Objectives and Related Indicators

This annex recommends a set policy-based indicators for monitoring the NEAP because the NEAP is ultimately a policy document and its implementation must be evaluated by policy-makers. The

recommendations are a mix of pressure, state and response indicators. Procedurally, these are all output indicators. The indicators are grouped according to the five strategic objectives identified in Chapter 5 of the NEAP:

- **Reduce or prevent pollution** - the NEAP should result in a situation where environmental damage is decreased or avoided altogether;
- **Improve access to basic environmental infrastructure and services** - the NEAP should help Turkish citizens to enjoy better environmental quality;
- **Encourage sustainable resource use** - the NEAP should help stakeholders to use renewable resources more sustainably;
- **Encourage sustainable environmental practices** - the NEAP should promote policies, programs and projects that sustain the environment and the economy;
- **Minimize vulnerability to environmental hazards** - the NEAP should reduce human and ecological exposure to natural as well as man-made disasters.

In addition, a number of general indicators can be collected that are relevant to more than one of these policy objectives.

The following table proposes a set of nearly fifty environmental indicators that can be used to assess whether the NEAP is succeeding in achieving each of these policy objectives. The table proposes a set of indicators for each of the five policy objectives as well as a set of general indicators.

Table A8.1: Indicators for Monitoring the NEAP

STRATEGIC OBJECTIVE	INDICATORS	COMMENTS
Reduce or Prevent Pollution		
Water quality	1) Child mortality from intestinal infectious diseases (per 1000 live births)	1) Comprehensive indicator of water pollution, household hygiene & food contamination
Air quality	2) Industrial & domestic wastewater treated (%) 3) Acute respiratory infection mortality 4) Days/year PM10 & SO ₂ limits exceeded (10 worst cities)	2) Measurement of prevention of water pollution 3) Associated with outdoor and indoor pollution as well as other factors (e.g. smoking) 4) Measures risk of exposure to general air pollutants
Land-based issues	5) Leaded gasoline consumption per capita 6) Solid waste generated per day (tons) 7) % of solid waste collected & adequately disposed 8) Toxic waste production (tons per year)	5) Measures risk of exposure to critical air pollutant 6) Extent of land pollution that may result from solid waste 7) Effectiveness of protection 8) Risk of pollution from toxic wastes
Global issues	9) % of toxic waste collected & adequately disposed 10) CO ₂ emissions from industrial processes ('000 tons & per capita annually) 11) CO ₂ emissions from fossil fuels/constant \$ of GNP 12) Methane gases from anthropogenic sources ('000 tons)	9) Effectiveness of protection 10) Measurement of key greenhouse gas produced per unit of population 11) Measurement of key greenhouse gas produced per unit of economic production 12) Measurement of important greenhouse gas by source
Improve Access to Basic Environmental Services		
Water and sanitation	1) % of population with access to safe drinking water 2) % of population with access to adequate sanitation	1) Access has a major impact on public health 2) Access has a major impact on public health
Solid waste	3) % of population with regular solid waste collection	3) Adequate waste removal is linked to public health benefits
Green space	4) M ² of green space/capita 5) Park land as % of municipal area	4) Quality of life indicator 5) Quality of life and ecosystem indicator
Encourage Sustainable Resource Use		
Biodiversity	1) % of land and marine resources protected 2) Area subject to low-medium-high human stress 3) No. of threatened species or extinction per year	1) Indicates protection of env. sensitive areas 2) Indicates magnitude of area at risk 3) Indicates loss or potential loss of biodiversity
Energy	4) GJ annually per capita & MJ per 1987 \$ of GNP 5) Renewable energy use as % of total energy use	4) Measures intensity and change in energy use 5) Indicates sustainability of energy consumption
Food (cereals)	6) Ave. yield (kg./ha./year) 7) Grain fed to livestock as % of total grain consumption	6) Productivity indicator 7) Indicates nature of demand for grain
Forests	8) Forest & woodland cover as % of total land area 9) Deforestation rate 10) Soil erosion rate	8) Used to measure change in forest cover 9) Sustainability indicator 10) Sustainability indicator
Soil	11) Annual water use (m ³ per capita)	11) Demand and public health indicator
Water resources	12) Water supply (m ³ /capita) % of freshwater resources withdrawn annually	12) Supply indicator 13) Sustainability indicator

Encourage Sustainable Environmental Practices		
Agriculture	1) Cropland per capita 2) Use of fertilizers (kg./km. ² of cropland)	1) Changes in land use 2) Indicates possible use of more organic methods
Global Issues	3) Production of CFCs (tons per year)	3) Gauges whether substitution of CFCs is taking place
Transportation	4) Motor vehicles per capita 5) % of urban trips made by public & non-motorized transport	4) Indicator of env. pressure 5) Indicates whether less polluting forms of transport are being used
Energy	6) Annual energy consumption per capita for space heating (TOE/person/year)	6) Assesses changes in household energy efficiency
Solid Waste	7) % of municipal solid waste recycled per year 8) % of industrial solid waste recycled per year	7) Measures rate of resource recovery from households 8) Measures rate of resource recovery from industries
Minimize Vulnerability to Environmental Hazards	9) Natural disaster mortality (deaths & injuries/year) 10) Manmade disaster mortality (deaths & injuries/year) 11) Traffic accident mortality (deaths per capita)	9) Measures human exposure to natural disasters 10) Measures human exposure to manmade disasters 11) Measures special case of risk from transportation systems
General Indicators		
Economy	1) Purchasing power parity per capita (current \$)	1) Relative strength of the economy 2) Indicator associated with many environmental factors
Education	2) Primary school enrollment rate (male, female)	3) Important for env. education
Health	3) Adult illiteracy rate 4) Child mortality rate (per 1000 live births)	4) Linked to env. quality 5) Linked to env. quality
Environmental finance	5) Life expectancy (years) 6) No. of EIAs prepared per year per constant \$ of GNP 7) Environmental taxes & subsidies per constant \$ of GNP	6) Measures use of EIAs with economic change 7) Measures application of economic instruments with economic change
Population Urbanization	8) Environmental protection expenditures per capita 9) Rate of population growth 10) % of total population living in urban areas	8) Gauges government & private sector investment in env. 9) Indicator of pressure on env. 10) Indicates exposure to special urban env. problems

Institutionalizing Indicators

These indicators must be regularly assembled, analyzed and disseminated if they are to be effective tools for monitoring NEAP implementation. Some of the needed information is already being collected, although not a regular basis, by the State Institute of Statistics (SIS). SIS capacity should be expanded and upgraded to collect the full set of indicators through necessary staff training, modification of procedures and acquisition of necessary equipment. At the macro level, SIS will could accelerate its

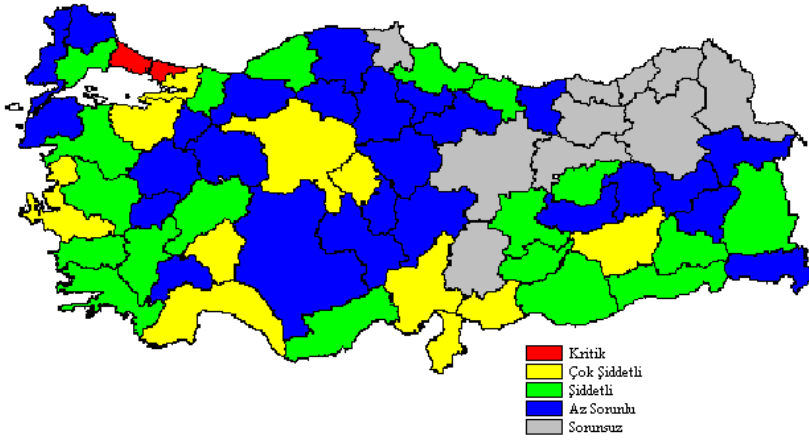
efforts to integrate environmental analysis into the national accounts and to prepare measures of wealth (produced assets + natural assets + human resources) as an aggregate indicator of sustainable development. An analysis of the indicators could then be conducted by the Ministry of Environment and/or State Planning Organization to determine whether progress was being made in NEAP implementation. To enhance information dissemination and public awareness, the following steps are recommended:

- Regular publication and distribution of the NEAP indicators;
- Preparation of an annual “State of the Environment” report based on analysis of the indicators as well as specialized information (reports, project feedback, studies) that becomes available during the year;
- Creation of a Web site for citizens and others to access the latest, as well as past, versions of the indicators and “State of the Environment” report; and
- Periodical stakeholder review of the indicators and monitoring process to assess their relevance and effectiveness.

ANNEX 9

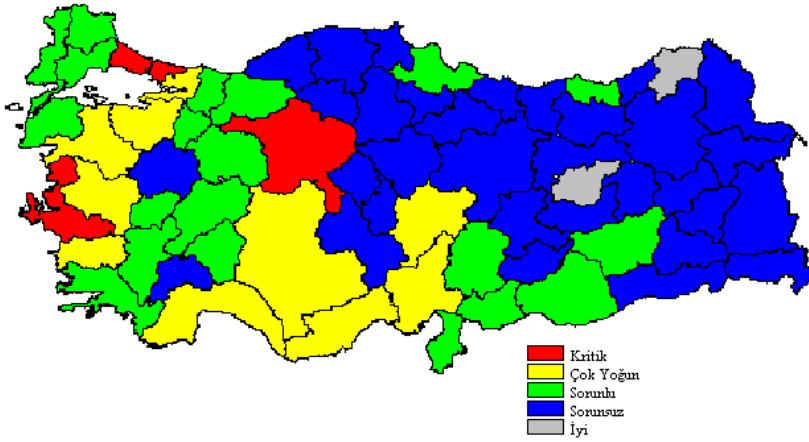
Spatial Analysis of Problem Areas

Map A9.1: Population Movement

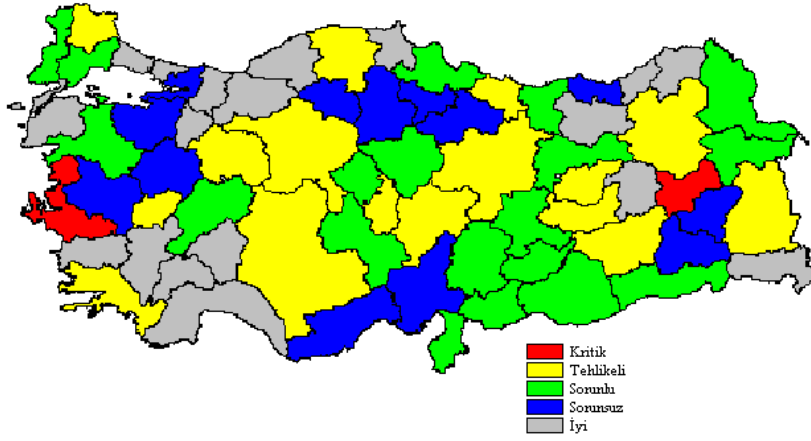


Note: Based on a composite index of quantitative increase in population, population density, changes in population density

Map A9.2: Urbanization Trends and Impacts on Environment

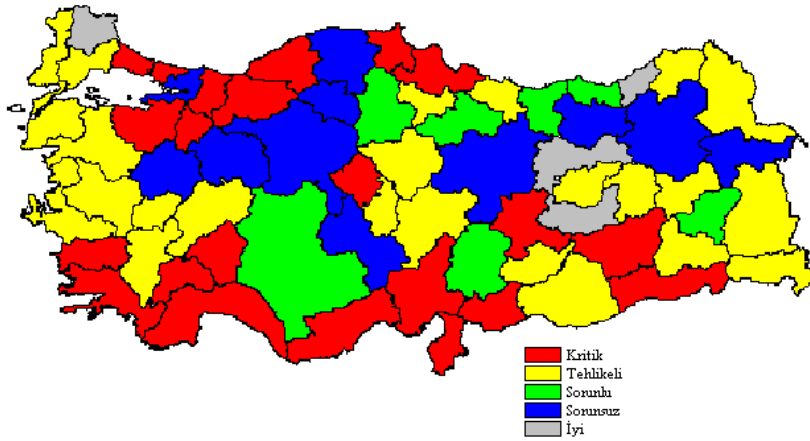


Map A9.5: Existence and Sustainability of Forests



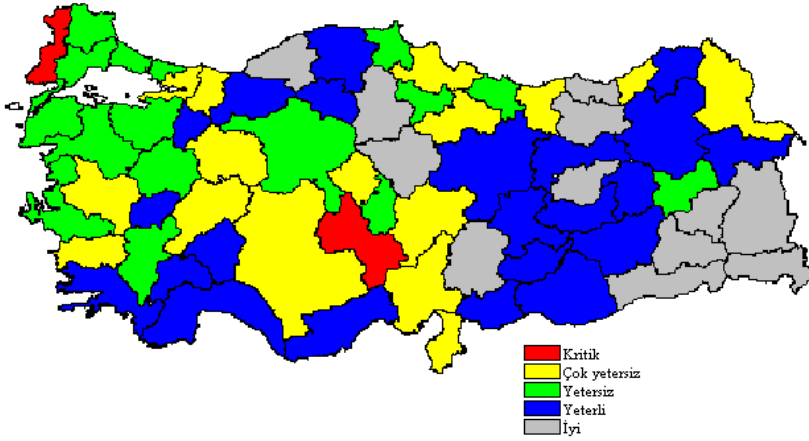
Note: based on a composite index of forest area per capita, % of forest in total provincial area, % of all forest classified as unproductive, and forest area per forest villager

Map A9.6: Sustainability of Pastures and Ranges



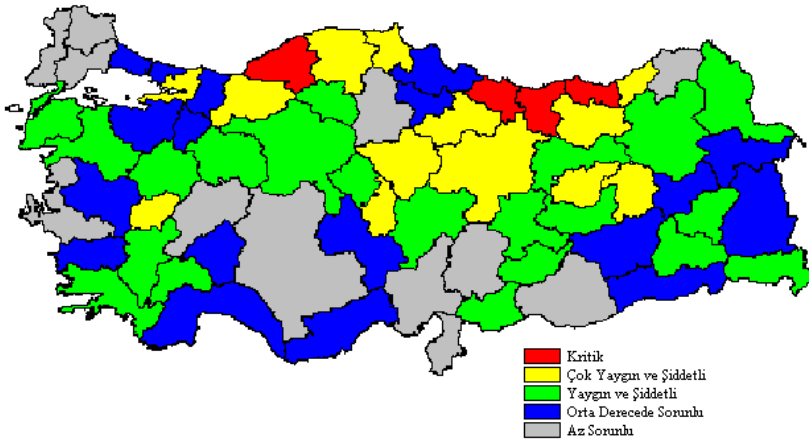
Note: Based on a composite index of permanent pasture and range land per unit of cattle loss of pasture and range land.

Map A 9.7: State of Land Resources



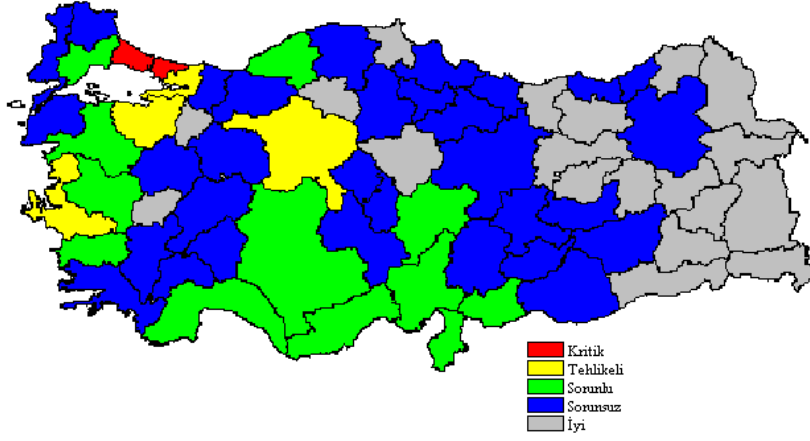
Note: Based on a composite index of ratio of land that is not arable, number of households per unit of cultivated land, ratio of villages using pesticides, ratio of villages using chemical fertilizers, rate of utilization of arable land for purposes other than agriculture, rate of utilization of uncultivable land for agricultural purposes, ratio of agricultural land with salination problem, ratio of agricultural land with aging problem.

Map A 9.8: Prevalence of Soil Erosion



Note: Based on a composite index of prevalence of erosion on arable land and prevalence of erosion on all land within each province

Map A9.9: Environmental Impacts of Industrialization



Note. Based on a composite index of share of active population employed in manufacturing industry, share of industrial value added, rate of the establishment of industrial enterprises, density of motor vehicles, total number of enterprises in small scale industrial sites.

Figure 4.1: NEAP Timeline

Actions	Year:	Term				
		Short	Medium		Long	
		1	5	10	15	20
Action Program for Enhancing Environmental Management System		=====				
1.1 Harmonizing Institutional Authority and Procedures		=====				
1.2 Harmonizing the Legislative Framework		=====				
1.3 Identifying Eco-basins		=====				
1.4 Local Environmental Action Planning		=====				
1.5 Making the EIA Process More Effective		=====				
1.6 Classifying and Planning Land Use Capacity		=====				
1.7 Completing & Managing Rural Cadastral Works		=====				
1.8 Preparing/Implementing National Productivity Action Plans		=====				
2.1 Managing Environmental Data		=====				
2.2 Environmental Education and Training		=====				
3.1 Improving Waste Management		=====				
3.2 Encouraging Clean Technologies/Energy Sources		=====				
3.3 Upgrading Urban Slums		=====				
3.4 Upgrading Rural Environmental Infrastructure		=====				
3.5 Improving Management of the Coastal Zone		=====				
3.6 Environmental Management for GAP Region		=====				
3.7 Reducing Environmental Risks		=====				
Collection of NEAP Indicators		=====				
Performance Reviews of NEAP			*	*	*	*
Design & Implementation of Long-term Actions						