GEF Country Portfolio Evaluation: Turkey (1992–2009)

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Contents

Technical Documents

TECHNICAL DOCUMENT A.

Country Environmental Legal Framework

1. Introduction/Background

Constitution

The environment largely entered into Turkey's legal agenda in the 80s with the 1982 Constitution on which the current environmental legal policy framework of Turkey is built. Articles 43, 44, 45, 56, 57 of 1982 are the first constitutional statements on environmental issues.[1]

Article 43: Utilization of the Coasts
"*In the utilization of sea coasts, lake shores or river banks, and of the coastal strip along the sea and lakes, public interest shall be taken into consideration with priority.*"

Article 44: Land Ownership
"*The state shall take the necessary measures to maintain and develop efficient land cultivation, to prevent its loss through erosion, and to provide land to farmers with insufficient land of their own, or no land.*"

Article 45: Protection of Agriculture, Animal Husbandry, and of Persons Engaged in These Activities
"*The state facilitates farmers and livestock breeders in acquiring machinery, equipment and other inputs in order to prevent improper use and destruction of agricultural land, meadows and pastures and to increase crop and livestock production in accordance with the principles of agricultural planning. The state shall take necessary measures to promote the values of crop and livestock products, and to enable growers and producers to be paid the real value of their products.*"

Article 57: Housing
"The state shall take measures to meet the need for housing within the framework of a plan which takes into account the characteristics of cities and environmental conditions and supports community housing projects"

The main and the most comprehensive Article on the environment is *Article 56* of the Constitution which recognizes the right of citizen to live in a healthy and protected environment by stating that "*Everyone has the right to live in a healthy, balanced environment. It is the duty of the state and citizens to improve the natural environment and to prevent environmental pollution*".[2]

Until 1983, there were no comprehensive environmental legislations except a few directives and regulations on environmental protection. For the purpose of overcoming the obstacles encountered in the environmental field, the Law No. 2872 on Environment was enforced in 1983.

By looking into the articles related to environment in the constitution, it is apparent that these are not very advanced in biodiversity and that the first priority is international laws. In addition, Turkey has made only limited progress with decentralization. Turkey is not a party to the Aarhus convention on Access to Information, Public Participation in Decision-making and Access to Justice in Environmental Matters. Nevertheless, strategic planning has been introduced, which consists of decision making by local governments.

The Five Year Development Plans

[1] Complete list of laws on environment enacted can be found in part 4.
[2] The Constitution of the Republic of Turkey.

Within this framework, the need for a Turkish National Environment Policy was first stated in the Third Five Year Development Plan covering 1973-1977. Article 1930 states the necessity of an overall legal coordination mechanism for the environment issues.

Article 1930 and 1930/4 and 1930/5:
Until today, environmental problems are mostly coordinated and issued by different Ministries. However, since the interest and conscience of environment in the international arena is growing, Turkey needs to re-scan its legal framework and need to adopt necessary adjustments with the coordination of the State Planning Organisation.

Both the Seventh and the Eighth Five Year Development Plans covering 1996-2000 and 2001-2005 respectively, incorporates environmental priorities within social and economic development plans.

As such, the 8th Five Year Development Plan, under Article 1799, appraises the recent initiative of the National Environment Strategy and Action Plan. However, in article 1800, the Plan points out current inefficiencies and states that "*Despite positive developments, environmental management systems could not be realized at a desired level of effectiveness*."

Likewise, the 9th Development Plan (2007-2013) puts utmost importance on the proper implementation of laws and regulations. Under Article 456, it states that, "*It will be ensured that the regulations regarding the environment will be implemented effectively by not allowing them to be interrupted as a result of amnesties*." Moreover, Article 462 promises that Turkey will prepare a national plan for reducing greenhouse gas emissions and take responsibility within the UNFCCC.

National Sustainable Development Frameworks

Hence, from the 9th Development Plan emerged the need for a detailed and a comprehensive plan embracing, in a concrete manner, both environmental issues and development priorities. Furthermore, the *1992 United Nations Conference on Environment and Development (UNCED) in Rio* made it urgent to build up an action plan at the national level, because the Rio Declaration referred to international Conventions to which Turkey is a signatory party.

The Rio Conference also initiated the process of a comprehensive global action plan, *Agenda 21,* which is local-government-led, community-wide, and participatory effort to establish a comprehensive strategy for action on environmental protection, economic prosperity and community well-being at the local level.[3] Furthermore, an action plan to pave the way for "*sustainable development*" was aimed at and implemented by the Turkish government (with the support of UNDP).[4]

Within an international legal context and the aforementioned National Development Plans, the Ministry of Environment of Turkey published in 1999 the *NEAP* "*National Environmental Action Plan*". This was financed by the *World Bank* and coordinated by the *State Planning Organisation (SPO)* and it covers a 20 years implementation period. The NEAP was also an important step in combining overall development targets with environmental objectives. In order to reach country's environmental objectives, the NEAP

- proposes a number of actions for developing an effective environmental management system,
- emphasizes the need for enhancing environmental information and awareness,
- includes a set of new investment proposals on different thematic areas, and
- builds the first steps to adopt EU environmental standards and regulations at a feasible pace for integration with the EU in the long term.[5]

[3] EU Integrated Environmental Approximation Strategy. (EU IEAS) Ministry of Environment and Forestry. 2006

[4] www.la21.net

5 National Environment Action Plan of Turkey. Ministry of Environment and Forestry. 1999

As acknowledged by the OECD Environmental Review of 2008, and as foreseen in the NEAP, environmental institutional capacity has been strengthened through the creation (i) thematic groupings of experts; and (ii) participatory conferences of stakeholders.

Nevertheless, the 2001 financial crisis impeded the implementation of the NEAP due to the tightening of the national budget. The 8th Five Year Development Plan (2001-2005) also states the inadequacy of NEAP in relation to the emerged financial difficulties and states "*the NEAP shall be revised and updated based on the legal framework*."[6]

Institutional Developments

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 Turkey, in order to meet the global requirements, decided to harmonize national environmental policies with approaches adopted by such international documents.

In parallel, reinforcement efforts by Turkey for the environmental legal framework continued with the establishment of the *Ministry of Environment (MoE) in 1991* as the main responsible state body from the environment. With the establishment of the MoE, the environmental responsibilities were delegated to central and local agencies and development plans associated accordingly. In 2003, the Ministry of Environment and the Ministry of Forestry merged to become the Ministry of Environment and Forestry (MoEF). This restructuring was accompanied by the recruitment of additional environmental staff *(around 500, between 2003 and 2007)* and by additional environmental financial resources.

In addition to meeting the requirements of the EU accession process [7]and serving the Local Agenda 21 targets, especially on the public participation themes, MoEF has established *ad hoc* consultative bodies with a Regulation[8] in 2004. The main aim of the consultative bodies is to ensure sustainable development and promote environmental protection. These consultative bodies are

- Supreme Council of Environment
- Local Environmental Board
- Environment and Forestry Council[9]

2. EU Approximation process

Thanks to the adoption by Turkey a National Programme for the Adoption of EU *Acquis Communautaire* in 2003 and opening membership negotiations with the EU starting in 2005, the policies concerning the environmental priorities were accelerated and re-strengthened through technical and financial assistance. The EU Environmental *Acquis* is one of the most comprehensive parts of the EU *Acquis Communautaire*.[10] In addition to requiring large-scale infrastructure investment for environmental protection throughout the country, the Environmental *Acquis* also necessitates the harmonization of legislation and the strengthening of institutional structure.[11]

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6 Article 1810. 8th Five Year Development Plan. State Planning Organisation. 2001

[7] Detailed Assessment of Turkish Implementation and Enforcement in Environment Sector. Developing Capacity in Implementation and Enforcement of Environmental Legislation in Turkey through the IMPEL Network Project funded by the EU. 2005

[8] Regulation no: 25674

[9] Detailed Assessment of Turkish Implementation and Enforcement in Environment Sector. Developing Capacity in Implementation and Enforcement of Environmental Legislation in Turkey through the IMPEL Network Project funded by the EU. 2005

[10] Environment Operational Progamme (EOP) 2007-2009. Ministry of Environment and Forestry

[11] EU Integrated Environmental Approximation Strategy. (EU IEAS) Ministry of Environment and Forestry. 2006

The Environment Operational Programme for 2007 – 2009 (EOP) is prepared as one of the basic planning and action documents that will help Turkey to enhance the performance of the environmental sector to be in line with European Union (EU) principles, policies and legislative framework. It has been formulated and developed by the Ministry of Environment and Forestry (MoEF) in close consultation with the European Commission. It is also one of four (4) programmers from the Strategic Coherence Framework (SCF), which are being elaborated with the aim of utilizing EU funds for the period of 2007 -2013.[12]

The EOP has been prepared in compliance with the partnership principle, actively involving all the relevant administrative socio -economic partners and NGOs. It has been framed as a '*stand -alone'* document and thus contains concrete background information and statistical data. Implementation of the EOP also stimulates economic activities in the regions and promotes new employment opportunities like recycling, innovative energy production, tourism and recreation. In this way environmental protection goes hand-in-hand with sustainable development in addition to creating a healthier and safer environment. Moreover, the EOP is designed in accordance with the goals of 9th development plan which states that 'Turkey will grow in stability, will share income equitably, will have global competitiveness, will move into a knowledge society and will complete the harmonization process for EU membership'.[13]

The overall objectives of the EOP are to

- improve environmental protection
- improve living standards for the population
- improve access to drinking water, wastewater treatment and integrated solid waste services
- strengthen capacity and governance[14]

In line with the EOP and through the EU integration process, the ***EU Integrated Environmental Approximation Strategy*** *(2007-23*) *(EU IEAS),* prepared by MoEF in 2006, in coordination with related institutions and organizations having important roles and responsibilities in environmental issues. It was adopted by the High Planning Council on February 2007.[15]

One of the primary concerns of the EU IEAS is the targets of harmonization of the EU Environmental *Acquis*. The Strategy included some (but not all) of the targets for completion of transposition into Turkish legislation, as well as some estimated means of implementing and enforcing the EU Environmental *Acquis*. The Strategy estimated that around *EUR 60 billion* was needed to meet the investment and operational costs of complying with them before 2023.[16] The Ministry of Environment and Forestation is responsible for the harmonization of national environmental legislation with the EU legislation and for its implementation.

For the purpose of overcoming the obstacles encountered in the environmental field, the studies for an amendment of Law No. 2872 on Environment have been completed and in Law No. 5491, an Amendment of the Law on Environment was issued. With this law, the framework of "Polluter Pays" ensures that it has become an obligation to determine the costs of solid waste and wastewater in a way that will cover investment, operation, maintenance costs, and it has been prohibited to spend the collected money anywhere outside the relevant services.[17]

In addition, according to the Environment Act No. 2872 of 1983, Environmental Impact Assessments (EIAs) are required to avoid certain polluting activities since 1993.

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[12] Environment Operational Progamme (EOP) 2007-2009. Ministry of Environment and Forestry

[13] 9th Development Plan. State Planning Organisation. (SPO)

14 Environment Operational Progamme (EOP) 2007-2009. Ministry of Environment and Forestry

15 EU Integrated Environmental Approximation Strategy. (EU IEAS) Ministry of Environment and Forestry. 2006

[16] OECD Environmental Performance Reviews on Turkey. 2008

[17] EU Integrated Environmental Approximation Strategy. (EU IEAS) Ministry of Environment and Forestry. 2006

Furthermore, it was taken into consideration that the preparation of the EU IEAS coincided with the strategies and policies of the Development Plans and other state plans. As such, the 8th Five Year Development Plan, even before the start of EU membership negotiations, indicated that "*Long term policies and strategies implemented for the solution of environmental problems shall be aligned with the EU norms and international standards by considering the needs of the country*."[18]

Turkey's efforts in the GEF focal areas also help in EU harmonization efforts. For example, in the area of ***Biodiversity***, the National Biological Diversity Action Plan (NBSAP), which has been established with the help of GEF funding, includes goals and actions that will affect all sectors that play a role in the conservation, management and utilization of biological diversity. The NBSAP has been added to the national programme within the EU harmonization efforts in Turkey.

Moreover, in terms of ***POPs***, the National Implementation Plan (NIP), also developed through GEF funding, contains both commitments to the Stockholm Protocol and commitments to harmonization with the EU *Acquis Communautaire.*

Turkey is a party to the United Nations Convention to Combat Desertification (UNCCD) which was signed in Paris in 1994 in its combat against ***Land Degradation***. Since the European Commission and EU Member States are party to the UNCCD, they also have an obligation to develop their national action plans on combating desertification. This means that the developed national action plan of Turkey, with the GEF support, also contributed to EU priorities and is in line with the EU Environment *Acquis* harmonization efforts.

Overall, the EU membership negotiations with Turkey with financial and technical assistance of the EU are one of the main drivers behind development of the Turkish environment legal framework. Since the EU and the Member States are parties to the major international environmental conventions and agreements, the EU *Acquis* on environment for Turkey is also in line with the provisions of the international agreements. Moreover, the draft national law on the Conservation of Nature and Biodiversity, which is an outcome of the GEF2 project in Turkey, also happens to be in line with the EU Directive 92/43/EEC on the Conservation of Natural Habitats and of Wild Fauna and Flora and the EU Directive 79/409/EEC on the Conservation of Wild Birds, which are part of the Environment chapter.[19] However, both the NBSAP and the Biodiversity law have not been implemented and not promoted by the parliament for a long time. Only when the Environment chapter was opened did these come back into the policy agenda in 2010.

3. Implementing international conventions

Turkey's recent National Development Plans paid particular attention to international co-operation on environmental issues. Furthermore, Turkey has been actively involved in the international agreements and conventions, since Turkey is currently

- an *EU* candidate county;
- a member of *European Council;*
- a member of European Environment Agency (EEA);
- one of the founding members of the *OECD;*
- a member of *UN* and its agencies such as *UNEP*, *UNDP*, *UNECE*, *UNIDO* etc.;
- a member of *G-20*[20]*;* and
- a member of *WTO*;

18 Article 1813. 8th Five Year Development Plan. State Planning Organisation. 2001

19 Turkey's Programme for Alignment with the Acquis (2007-2013). European Union Secretariat General.

20 The G-20 is an informal forum in the Ministerial Level of 20 industrialized countries which promotes open and constructive discussion between industrial and emerging-market countries on key issues related to global economic stability.

Also, specific targets are determined in major reports prepared through international environmental conferences/conventions, national action plans and the process of implementing environmental legislation. Overall, they encourage Turkish international participation and demonstrate coherent attention to achieving the following goals:

- utilizing fully and efficiently the technical and financial resources available from international organizations and programmers (e.g. *GEF, UNDP, EU, FAO Multilateral Fund for the Implementation of the Montreal Protocol*);
- fulfilling commitments assumed under international conventions and agreements (e.g. on depletion of the ozone layer, trade in endangered species hazardous wastes, biodiversity);
- supporting the international community in addressing environmental "commons" issues (e.g. climate change, ozone depletion, fishery management), consistent with the principle of "common but differentiate responsibilities";
- strengthening regional co-operation and institutions to address priority national environmental challenges and shared problems (e.g. maritime safety, marine pollution); and
- upgrading environmental performance, laws and institutions within the framework of EU convergence efforts.[21]

In the broader sense, the Turkish environmental legal framework and its policies are in parallel with the international context of environmental agenda. Table 1 provides the international environmental conventions and treaties ratified by Turkey.

[21] OECD Environmental Performance Reviews on Turkey. 2008

Table 1 International Environmental Conventions an Agreements Ratified by Turkey

Law/Regulation	No.	Date of Enactment / Amendments
Law on Sea Ports	618	1925
Law on Geothermal and Natural Mineral Waters	5686	1926 / 2007
Forest Law, making the state the sole owner of the forest	4785	1945
Law on the Organization and Responsibilities of the State Hydraulic Works	6200	1953
Last Forest Law	6831	1956 / 1986
Law on Underground Waters	167	1960
Law on the Procedure of Administrative Justice	2577	1982
Law on National Parks	2873	1983
Law on Environment	2872	1983 / 2006
Law on Mining	3213	1985 / 2004
Regulation on Protection of Air Quality	19269	1986
Regulation on Solid Waste Control	20814	1991 / 2005
Law on the Organization and Responsibilities of the Ministry of Environment and Forestry	4856	1991 / 2003
Regulation on Dangerous Chemicals	21634	1993 / 2001
Regulation on Environmental Impact Assessment	25318	1993 / 2004
Law on Reforestation and Soil Erosion Control	4122	1995
Law on Fisheries	1830	1995 / 2006
Regulation on Soil Pollution Control	24609	2001 / 2005
Regulation on Environmental Inspection	24631	2002
Regulation on the Conservation of Wetlands	25818	2002
Regulation on Informing Consumers on Fuel Economy and CO_2 Emissions of New Passenger Cars	25530	2003
Regulation on the Basis and Procedures of the Implementation of the Law on the Right Access to Information	18132	2004 / 2005
Law of Organic Agriculture	5262	2004
Law on Municipalities	5393	2004
Regulation on Packaging and Packaging Waste Control	25538	2004 / 2007
Law on the Use of Renewable Energy Resources for Electricity Production Purposes	5346	2005
Regulation on the Control of Air Pollution from Heating	25699	2005
Regulation on Hazardous Waste Control	25755	2005
Regulation on Medical Waste	25883	2005
Regulation on Environmental Noise and Management	25862	2005 / 2008
Regulation on Control of Air Pollution of Industrial Plants	26236	2006
Law on Nuclear Energy	5710	2007
Law on Energy Efficiency	5627	2007
Biosafety Law	5977	2010

4. Policy and legislation

The purpose of legal arrangements in the environmental area is to determine necessary standards and behavioural patterns of authorized agencies and citizens in order to live in a healthy and a balanced environment. Regulations, directives, circulars, notifications etc. that were issued on the basis of these laws and initiatives determining basic principles include the details related to procedures and methods with which to be complied.[22]

Turkey's national environmental legal framework has been shaped through a number of regulatory instruments and Turkey has enacted numerous laws and regulations.Within the framework of *Article 56 of the 1982 Constitution*, the *Environmental Act* No 2872 was passed in 1983 aiming to contribute legally to the environmental protection mechanisms in Turkey. This Act 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.[23] The basic principles of the Turkish Environment Act towards environmental protection can be summarized as

- Real and legal persons are responsible for protecting the environment and preventing the environmental pollution;
- Polluter pays principle;
- Most appropriate technologies and methods are selected and implemented in economic activities with the objective of preventing and limiting environmental problems; and
- Measures to be taken to protect the environment and to prevent pollution shall be identified and implemented as an integrated whole.[24]

Legally, forestry in Turkey is also based on the 1982 Constitution and the Forestry Law. Article 169 of the Constitution and the *Forestry law (No: 6831*) constitute the main legal framework for the forestry in Turkey. The sustainability of forests and the interactions between forests and the public are addressed in the Constitution. Constitution gives the direction as "*measures for the development of the people living in or around the forests, for the conservation of the forests and their integrity, and for the enhancement of the public-State relations in terms of protection and utilizing of the forest will be taken"*.[25]

Special interest should be given to the period after the commencement of the EU membership process since the environmental issues have been very much accelerated. Especially, the legislative changes culminated in a *comprehensive 2006 amendment to the 1983 Environment Act*. This amendment included special focus on the polluter- and user-pays principles, as well as the participatory and precautionary approaches, opening up possibilities for greater use of economic instruments, environmental liability and enhanced public access to environmental information.

Through the EU membership negotiations, so far Turkey has updated large parts of the country's environmental legislation. Overall, 44 new pieces of legislation or major amendments were adopted.[26] *OECD 2008 Environmental Performance Reviews* assesses the Turkish environmental legal framework as "*… stronger and closer to the EU environmental Acquis Communautaire."*[27]

Table 2 provides the related environmental laws and regulations enacted.

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[22] EU Integrated Environmental Approximation Strategy. (EU IEAS) Ministry of Environment and Forestry. 2006.

23 National Environment Action Plan of Turkey. Ministry of Environment and Forestry. 1999.

[24] *Detailed Assessment of Turkish Implementation and Enforcement in Environment Sector*. Developing Capacity in Implementation and Enforcement of Environmental Legislation in Turkey through the IMPEL Network Project funded by the EU. 2005

25 Çağlar, Y., 1998, Sustainability and the Turkish Forestry, Environment Foundation of Turkey Publication No: 126, (61-75), Ankara

[26] OECD Environmental Performance Reviews on Turkey. 2008

[27] OECD Environmental Performance Reviews on Turkey. 2008

By looking into the timeline in Figure 1, it can be seen how GEF has contributed to Turkey's development of environmental laws by speeding up the process. As a recent driver, the EU Approximation process has accelerated this. Without GEF there would not be a Biosafety law, the size of protected areas would have been smaller and Climate Change would not have been given the priority it currently has.

By analyzing the timeline in further detail, we can make a number of observations:

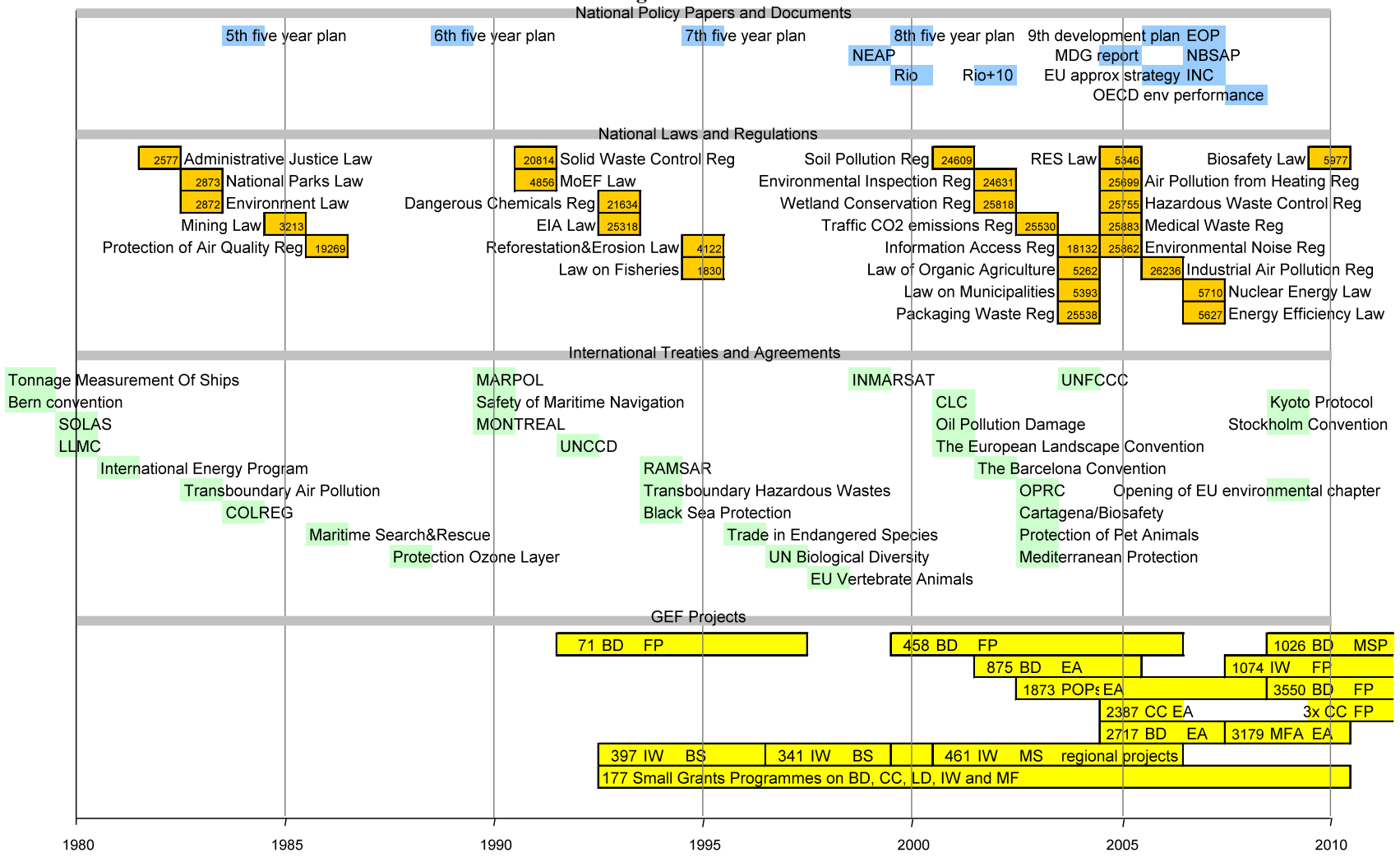
- Both the GEF1 project and the Small Grants Programme (SGP) have been ongoing prior to the UN convention on biodiversity, NEAP, Rio and Rio+10. These will have speeded up the convention signature and the policy documents on NEAP, Rio and Rio+10, even though it cannot be concluded that the GEF projects were the main cause.
- The regional Black Sea GEF projects commenced one year prior to Turkey's signature of three treaties on RAMSAR, Transboundary Hazardous Wastes and, most importantly the Black Sea Protection. This indicates a clear catalyzing role of GEF.
- The regional Mediterranean Sea GEF projects commenced two/three years prior to Turkey's signature of two important treaties on The Barcelona Convention and Mediterranean Protection, again indicating the catalyzing role of GEF, even though these have not been nation GEF funded projects.
- One year after the commencement of the biosafety GEF enabling activity, the Cartagena protocol on biosafety has been signed by Turkey. Moreover, the Biosafety Law has been approved by the Turkish National Assembly on 18 March 2010 under law number 5977 and published in the OJ dated 26 March 2010 under number 27533.
- The enabling activity on the initial national communication (INC) on climate change followed Turkey's signature to UNFCCC and preceded the publication of the INC in 2007 and the signature to the Kyoto protocol in 2009. The full credit cannot be given to the GEF project, but it certainly had a catalyzing effect and it helped speeding up the process of Turkey to take a position related with climate change.
- Finally, one year after completion of the GEF POPs enabling activity, Turkey signed the Stockholm convention. At this time, GEF put POPs on the agenda in Turkey.

Table 2 Selected National Laws/Regulations on Environment

Convention/Agreement	Year of Ratification
The Convention for the Protection of Birds (Paris Agreement)	1950
The International Maritime Organization Agreement (IMO)	1956
Treaty Banning Nuclear Weapon Tests in the Atmosphere, in Outer Space and Under Water (Moscow Agreement)	1965
The Convention On Load Lines	1968
The Convention On Tonnage Measurement Of Ships	1979
The Convention on the Conservation of European Wildlife and Natural Habitats (Bern Convention)	1979
The Convention for the Life Safety At Sea (SOLAS)	1980
The International Convention on Limitation of Liability for Maritime Claims (LLMC)	1980
The Agreement On an International Energy Program	1981
The Convention on Long-range Transboundary Air Pollution	1983
The Convention on the International Regulations for Preventing Collisions at Sea (COLREG)	1984
The Convention Of Maritime Search and Rescue	1986
The Convention for the Protection of the Ozone Layer	1988
The International Convention for the Prevention of Pollution from Ships (MARPOL)	1990
The International Convention for the Suppression of Unlawful Acts against the Safety of Maritime Navigation	1990
The Protocol on Substances That Deplete the Ozone Layer (MONTREAL)	1990
United Nations Convention to Combat Desertification (UNCCD)	1992
The Convention on Wetlands of International Importance (RAMSAR)	1994
The Convention on the Transboundary Movement of Hazardous Wastes and Their Disposal	1994
The International Convention on Protection Of The Black Sea Against Pollution and additional protocols	1994
The Convention on International Trade in Endangered Species of Wild Fauna and Flora	1996
The United Nations Convention on Biological Diversity	1997
The European Convention for the Protection Vertebrate Animals Use for Experimental and Other Scientific Purposes	1998
The Convention Of The International Mobile Satellite Organization (INMARSAT)	1999
The International Civil Liability Convention on the Oil Pollution Damage (CLC)	2001
The International Convention on the Establishment of an International Fund for Compensation for Oil Pollution Damage	2001
The European Landscape Convention	2001
The Barcelona Convention and its additional protocols	2002
International Convention on Oil Pollution Preparedness, Response and Co-operation (OPRC)	2003
the Additional Bio-safety Protocol to the Convention on Biological Diversity (Cartagena)	2003
The European Convention for the Protection of Pet Animals	2003
The Protocol on The Prevention of the Pollution in The Mediterranean Caused by the Transboundary Movement of Hazardous Wastes and Their Disposal	2003
United Nations Framework Convention on Climate Change	2004
Kyoto Protocol	2009
Stockholm Convention	2009

Figure 1 illustrates the connection between the timing of laws/regulations, the ratification of treaties and the implementation of GEF projects.

Figure 1 Timeline



5. Implementation status and challenges

Biodiversity

The "*UN Convention on Biological Diversity" was* signed after 1992 Rio Conference and ratified through *Law 4177* of 29 August 1996. The Convention went into effect in Turkey on 14 May 1997.

Currently, the Turkish authorities are becoming increasingly aware of both the importance of biodiversity and the significant threats to its sustainable management, which include a variety of unsustainable land and natural resource practices that are increasingly impacting Turkish ecosystems. This challenge is also taken up by the National Environmental Action Plan (NEAP), which was prepared with the involvement of Government, Municipalities, the private sector, and the NGO community.

Following the NEAP and the EU IEAS, Turkey, under the influence of its international obligations stemming from the CBD, prepared its *National Biological Diversity Action Plan (NBSAP)* in 2001. This was revised and updated in 2007 with the help of a GEF enabling activity.

The NBSAP was prepared under the coordination of MoE[28] in order to implement the UN Convention on Biological Diversity in harmony with other obligations and to address the problems caused by the loss of biological diversity. However, the NBSAP is regarded as a dynamic tool which may be renewed and updated as goals are reached and conditions change.[29] The updated NBSAP sets out to rapidly identify and assess Turkey's biological diversity to determine an agreed strategy for conservation, and to present decision-makers with proposals for the action required to achieve the goals of biological diversity conservation in Turkey. Currently, the NBSAP is officially on stand-by due to budgetary and human resources difficulties,[30] but there might other forces in play as well, including the vested economic interests of actors who want to benefit from forest resources, namely logging companies, transport links, tourism, and local grazing pressures.

The NBSAP includes goals and actions that will directly or indirectly affect all sectors that play a role in the conservation, management and utilization of biological diversity. It also defines the priorities and commitments of Turkey at the international level with regard to the conservation and sustainable use of biological diversity. Currently, MoEF and UNEP is implementing the project of "*National Capacity Self Need Assessment for the Proper Implementation of Rio Agreements in Turkey*" (NCSA) co-funded by the *GEF* and the Turkish government. With this project, Turkey aims to:

- identify, confirm or review priority issues for action within the thematic areas of biodiversity, climate change and desertification/land degradation;
- explore related capacity needs within and across the three thematic areas;
- catalyze targeted and co-ordinated action and requests for future external funding and assistance; and
- link country action to the broader national environmental management and sustainable development framework.

Turkey has also ratified the Cartagena Protocol on Biosafety (June 2003). This was supported by the UNEP/GEF project on the development of National Biosafety Framework. This project was also supported by the State Planning Organization (SPO). The project showed that the current law was not sufficient for the implementation of the Protocol and the need for a new biosafety law arose. A Commission was established to prepare a draft law on biosafety. Currently, the Biosafety Law has been approved by the Turkish National Assembly on 18 March 2010 under law number 5977 and published in the OJ dated 26 March 2010 under number 27533.[31]

Climate Change and Renewable Energy

Turkey became a party to the UNFCCC on May 24, 2004. As an OECD country, Turkey has a sui generis status within Annex I parties. Turkey's CO_2 emissions per capita at 3.1 are much lower than OECD average emissions per capita at 12.1 in 2004. In order to determine the policies to be followed, the measures to be taken and the activities to be

28 During the NBSAP preparations the Ministry of Environment was not yet merged with the Ministry of Forestry.

29 National Biological Diversity Strategy and Action Plan (NBSAP). Ministry of Environment and Forestry. 2007

30 Meeting Minutes of Ministry of Environment and Forestry. General Directorate of Natural Resources and National Parks. Erdogan Erturk, Engineer, GEF-2 Project Coordinator, and Mustafa Yilmaz, Sultan S. site Manager. 26.10.2009

31 Baran, Melike. Yılmaz, Remziye. The Bio-Safety Protocol of GMOs in Turkey Environ. Biosafety Res. 7 (2008) 57–59. EDP Sciences, 2008.

conducted by Turkey in the field of climate change, the Coordination Board on Climate Change (CBCC) was established pursuant to the Prime Ministry Circular no 2004/13 under the Chairmanship of the Ministry of Environment and Forestry. "The Bill on the Endorsement of Turkey's Ratification of the Kyoto Protocol to the *United Nations Framework Convention on Climate Change (UNFCCC)*" was adopted in the General Assembly of the Turkish Grand National Assembly on February 5, 2009. In accordance with the Article 25 of the Kyoto Protocol, Turkey officially became party to the Protocol on August 26, 2009. [32]

The National Climate Change Strategy Document was developed in 2009, under the coordination of the Ministry of Environment and Forestry, with the participation of public and private sector institutions, nongovernmental organizations and universities. This document was prepared and developed with the UNDP Technical support and the GEF funding.

The First National Communication on Climate Change which was published in 2007. This became a strategy document for Turkey in the field of climate change. Within this framework, the *National Climate Change Strategy (NCCS) Document* determines the priority activities in concerned sectors and the urgent measures to be taken to address the country's vulnerability within the framework of combating climate change.[33] Turkey's approach also includes the objective to participate actively in the Conference of Parties (COP) meetings, to negotiate and to have interest reflected. Turkey is also committed to preparing and developing the '*National Climate Change Action Plan*', based on the '*National Climate Change Strategy'* and the Ninth Development Program.

Within the framework of NCCS, in the field of energy, Turkey is committed to use clean and highly efficient resources in all new facilities from buildings and industrial plants. GEF support to Turkey in terms of the Climate Change is in line with the country's specific development plans and policies. So far, the GEF Council has approved important projects in supporting the transformation of Turkey to the Climate Change oriented policies and applications in the Turkish market. As such, with the projects "*Promote Energy Efficiency in Buildings*", "*Improving Energy Efficiency in Industry*", and "*Market Transformation of Energy Efficient Appliances in Turkey*", GEF is going to financially support the Turkish efforts in line with the current national development goals and policies within the climate change priorities.[34]

Energy efficiency policies have been implemented in the industrial, residential and services sectors. In 2004, the *Energy Efficiency Strategy* was adopted to support, in a more comprehensive way, energy efficiency in the final energy consumption sectors and more actively engage ministries and stakeholders in applying energy efficiency measures. In 2007, the *Energy Efficiency Law* was adopted to facilitate the implementation of the strategy. Its main provisions include: increasing energy efficiency awareness, training for energy managers and the staff of future energy service companies, and improving administrative structures for energy efficiency services.[35]

International Waters

The recently completed twinning project "*Capacity Building Support to the Water Sector in Turkey*" has created a roadmap for Turkey to manage water quality in the its 25 river basins.[36] The Buyuk Menderes river basin (discharging in the Aegean Sea) has been studied in detail as a pilot project. The main conclusion of this project is that the water quality in Turkey is at a comparable level with other EU member states and that Turkey is already taking a number of measures to manage water quality even though it is not yet enough to meet the requirements in three relevant EU directives:

- Water framework directive
- Dangerous substances directive
- Urban waste water treatment directive

With regards to the Mediterranean Sea, Turkey has adopted the "Land Based Pollutants (LBS) Protocol" to protect the Mediterranean Sea (under the Barcelona Convention). All party countries are required to prepare a ***National Action Plan Against Land Based Pollutants*** including the prevention measures packages, implementation and time tables.

[32] National Climate Change Strategy. Ministry of Environment and Forestry. December.2009
[33] National Climate Change Strategy. Ministry of Environment and Forestry. December.2009
[34] http://www.gefonline.org
[35] OECD Environmental Performance Reviews on Turkey. 2008
[36] Leading to three documents: (1) Buyuk Menderes River basin management plan, final draft, (2) Draft National Implementation Plan Water Framework Directive (2000/60/EC) and (3) Draft National Implementation Plan for Directive 2006/11/EC on dangerous substances. MoEF and DSI.

With regards to the Black Sea, under the coordination of the MOEF, Turkey has prepared several studies related to the "Protocol for the Control of Land Based Pollutants" to protect the Black Sea (Annex to the Bucharest Convention). For example, the Marmara Research Centre at the Institute for Chemistry and Environment undertook the "Development of the National Action Plan for the Land Based Pollutants" project[37].

Within this framework, a national action plan with respect to the land based pollutants covering both the Mediterranean Sea and the Black Sea has been developed, but is not yet under implementation.

Moreover, Turkey has also prepared the "National Black Sea Strategic Action Plan" (NBSSAP) with the support of the GEF Funded project "Developing the Implementation of the Black Sea Strategic Action Plan". This project aimed at sustainable institutional and financial arrangements for effective environmental management and protection of the Black Sea, in accordance with the Black Sea Strategic Action Plan (BSSAP). The project constitutes a basis for the development of the NBSSAP and it supports institution-building at the national and regional level for the development and implementation of such plans.[38] Each country located around Black Sea coasts has formulated its own NBSSAP. Currently all NBSSAPs are being monitored by the Black Sea Commission.

In addition, as part of the NBSSAP, a Report of Technical Recommendations with the assistance of the *GEF-Black Sea Environmental Program* was formulated in 1998 in Turkey.[39] Finally, the Black Sea ecosystem recovery project (BSERP) has been implemented in 2002–2007 aiming for full operationalization of the Bucharest Convention and its Secretariat. Through BSERP, the Bucharest Convention was analyzed and compared to other regional conventions with the support of EC funding (the results were presented at the 18th Regular Meeting of the Black Sea Commission). This study made it clear that the Convention on the Protection of the Black Sea Against Pollution requires substantial reworking to make it an 'environment' convention rather than just a 'pollution' convention.

Land Degradation

Turkey is one of 191 Parties to the *United Nations Convention to Combat Desertification (UNCCD)*. This was signed by the Minister of Environment on behalf of Turkish Government in 1994 in Paris. The Convention was approved and ratified by the Turkish Parliament in 1996 and 1998 respectively with the Law 4340. The Ministry of Environment and Forestry of Turkey is responsible for the coordination of the implementation of the Convention at national level. The National Coordinating Body (NCB) was established for evaluation and review of achievements made and difficulties faced in the implementation of the Convention at national level. It is composed of technical and administrative staff from key institutions involved in combating drought and desertification.

The Turkish National Action Program for Combating Desertification (NAPCD), as a prerequisite responsibility of the country parties signatory to the Convention, was finalized in mid-2004 as a result of several meetings and consultations during a three-year period and published in March 2005.

Complementary to the NAPCD and development plans, the World Bank helped finance a priority Turkish initiative titled as "*Eastern Anatolia Watershed Rehabilitation Project*". This project broadly addressed the problems of rural poverty and degradation/erosion of natural resources in 11 provinces in the eastern region of the country. The basic aims of the project were to improve the management of forestry, rangeland and agricultural activities in micro-catchments, through preventing and/or mitigating water erosion, and increasing soil productivity and rural income in order to maintain the sustainability of resources. The project started in 1993 and was implemented over seven years. The project might be considered as a pioneer initiative and as a successful case study by considering its outcomes.[40]

Overall the contribution of GEF funds to prevent land degradation has been very limited, because Turkey cannot access GEF Full Projects for land degradation, and only a small number of Small Grant Program (SGP projects addressed this issue. However, even this funding opportunity disappeared after the introduction of the RAF Mechanism in 2007, which required SGPs to focus on climate change and/or biodiversity. In Turkey, perhaps the most active NGO on land degradation is TEMA, which is a civil society organization that has private sector and international funding and works extensively towards creating public awareness on the issue of land degradation.

On the side of the government, erosion control is undertaken by the General Directorate of Afforestation and Erosion Control in forestlands, by the General Directorate of Public Water Works in dam catchments, by the Ministry of

[37] Funded by The Scientific and Technological Research Council of Turkey (TUBITAK).
[38] http://www.gefonline.org
[39] National Action Plan for Land Based Sources For Turkey. TUBITAK. 2005
[40] http://www.unccd.int/

Agriculture and Rural Affairs in farm and rangelands. Furthermore, Special Provincial Administrations and Municipalities undertake these works in their responsibility areas.

POPs (Persistent Organic Pollutants)

With regards to POPs, Turkey signed the *Stockholm Convention on Persistent Organic Pollutants (POPs)* in 2001 and ratified it in 2009. In response to the requirements of the Convention, Turkey was obliged to develop and implement a *National Implementation Plan* (NIP) according to the rules and procedures of the Convention. The international community helped Turkey implement these environmental policies/legislation through GEF funded project "*Enabling activities to facilitate early action on the implementation of the Stockholm Convention on Persistent Organic Pollutants (POPs) in the Republic of Turkey*" between 2003 and 2004. The NIP provides a basic and essential level of information to enable policy and strategic decisions to be made and identify priority activities that Turkey should undertake in order to meet the requirements of the Stockholm Convention.

6. Implementation Challenges

Regarding implementation, fresh developments in Turkey's EU membership negotiations should be taken into account. By opening the negotiations on the Environment chapter of the EU *Acquis Communautaire*, Turkey presented a Negotiation Position Paper containing a time-table on the implementation and the enactment of the related EU Laws and regulations, committing to enact and implement the necessary laws and regulations within the presented time-table.

However, despite the progress in aligning the country environmental framework with the EU environmental legislation, several pieces of legislation concerning air, water and nature protection are still to come through, and several standards are not consistent with EU limit values. The recent OECD Environmental Performance Review (2008) summarized the challenges in the implementation of environmental legislations as follows:

- allocation of environmental responsibilities among government institutions are not clear;
- the use of a variety of economic instruments for environmental purposes (including specific taxes, charges, emission trading systems) in Turkey is not considered to meet objectives of efficiency and financing;
- adoption of environmental management systems in industry and public organizations as well as development of public-private partnerships is not promoted;
- the challenge of mobilizing substantial financial resources for environmental investment is still the issue;
- the capacity of provincial and local authorities to prepare detailed projects is not enough;
- implementation of polluter pays and user pays principles is not fully functioning[41].

In parallel to the OECD analysis, the 9th Five Year Development Plan indicates the lack of technical and administrative capacity in the local administrations under the environment chapter by stating that "Technical and administrative capacities of local administrations will be increased and their financial means will be enhanced to realize effectively the additional investments in the EU harmonization process." Moreover, the plan also puts forwards the target that "It will be ensured that the regulations regarding the environment will be implemented effectively by not allowing them to be interrupted as a result of amnesties."[42]

[41] OECD Environmental Performance Reviews on Turkey. 2008
[42] 9th Five Year Development Plan. State Planning Organization (SPO)

TECHNICAL DOCUMENT B.

Global Environment Benefit Assessment

Country Context

Turkey is one of the world's most geopolitically strategic countries, located at the crossroads of Asia, Europe and Africa. Linking Europe to the Middle East and East Asia, it is the center of major trade and migration routes and a unique bridge between Eastern and Western civilizations. Turkey has land borders with Bulgaria and Greece in the west, Georgia, Armenia, Azerbaijan (Nakhichevan) and Iran in the east and Iraq and Syria in the south. The rest of Turkey is surrounded by the Black Sea, the Aegean and the Mediterranean Sea. The Black Sea is linked to the Mediterranean and linked to the world through the Bosporus, the Dardanelles and the Marmara Sea.

Turkey is a member of many international organizations such as the United Nations, the Council of Europe, the North Atlantic Treaty Organization, Organization for Economic Cooperation and Development, the Organization for Security and Cooperation in Europe, World Trade Organization, Organization of Islamic Conference (OIC), the Black Sea Economic Cooperation Organization and the Economic Cooperation Organization. Turkey is currently in the negotiation process for full EU membership.

Turkey's territory (including lakes and islands) covers 783,562 sq km. Its borders are 2,875 km in length and its coastline of 8,333 km. Turkey is larger than all its neighbors except Iran. It is bigger than all European countries except for the Russian Federation. The population of Turkey is close to 74 million[43]. Population growth, at 1.3% in the last decade, remains strong by EU standards, but has slowed down substantially from an average rate of 2.5% in the 1970s and 2% up to 1990. The country has a young, rapidly urbanizing population. The average age is 27 years, with 27.2% of the population below 14 years of age, and 66.7% between 15-64 years. In recent years, there has been a high level of migration from rural areas to major cities and, increasingly, to regional centers. For example, approximately 25% of the population is concentrated in the Marmara region (north-west), which includes Istanbul (the largest city) and Bursa. The urban population accounted for 59% in 1990 and has increased to 76% by the end of 2009.[44]

Turkey is a large middle-income country, with a GDP per capita of US$ 10,745[45] in 2008. Despite a highly volatile economic development in the past, Turkey's economy grew at an annual average rate of 6.8% during 2002-2007, one of the highest in the world and almost twice as fast as in the preceding decade. The economy slowed down towards the end of 2008 - as a result of the global financial crisis. The economy remains vulnerable to external shocks and continued implementation of reforms will be important for long-term sustainable growth.

There are major regional disparities within the country in both quantitative and qualitative aspects. The northwest region of Turkey accounts for about one-third of GDP. The capital, Ankara, and the region west and south are also significant areas of economic activity, and are leaders in tourism and agriculture activities (Antalya, on the south coast is the leading tourist destination). However, the Eastern and Southeastern part of Anatolia regions are much poorer and have sharply lower human development indicators than Western areas[46]. In these areas, poverty restricts the poor's access to many resources and services. This has been a long standing economic and social issue in the country. However, the recent government has paid attention to the issue, notably within the framework of EU pre-accession discussions.[47] In Turkey, "Lagging" regions (Eastern Anatolia, Southeastern Anatolia and Black Sea) account for 40 percent of land area, 30 percent of population, but less than 20 percent of the economy. Per capita GDP is only 60 percent of the national average[48]. The Southeast has attracted special attention. In these areas the population is decreasing due to out-migration. Development was also undermined by insufficient investment and remoteness from major domestic markets.

Turkey has significant geological resources. It has large reserves of coal (mostly lignite), iron ore, metals and salts. Boron metals are also significant for international trade. However, it has only limited reserves of oil and natural gas and

[43] Source: World Bank, 2008, Country Brief, www.worldbank.org.
[44] Source: The Turkish statistical institute (TUIK) http://www.tuik.gov.tr/VeriBilgi.do?tb_id=39&ust_id=11
[45] Source: World Bank, 2008, Country Brief, www.worldbank.org.
[46] UNDP, Human Development Report, 2004
[47] SPO, Experts Commission Report on "Income Distribution and Poverty Reduction", Ankara, 2007, page 39-52.
[48] "Turkey: Country Economic Memorandum, Sustaining High Growth: Selected Issues", Report Number 39194, The World Bank, 10 April 2008

accordingly it relies heavily on fuel imports. Hydroelectric power is another important source of energy in the country. Just over half the electricity production is done by the private sector, but the main producer remains state-owned. Also, the state continues to dominate trading, transmission and distribution of electricity (government runs the transmission grid). Privatization will be completed for distribution companies and will commence for state generation assets in 2010. Underinvestment in power generation has led to power shortages, and the blackouts are likely to increase.

Turkey also has significant natural resources. Its fertile plains, rivers and seas create a high potential for agriculture and raising livestock with. Approximately 30% of Turkey is arable land, while 3% is dedicated to orchards, olive groves and vineyards, and 26% is classified as forest. Main production areas include the high Anatolia central plateau, a narrow coastal plain and several mountain ranges, all located in temperate climatic zones. Water resources are less plentiful than in Western Europe, but much less scarce than in most of the Middle East. Turkey's long coastlines offer opportunities for shipping, fishing and tourism. Finally, much of Turkey is vulnerable to earthquakes, especially northern Turkey along an arc from the Sea of Marmara to Lake Van.

Starting in the 1990's, the Government started to focus seriously on environmental protection, notably since the establishment of the Ministry of Environment in 1991. EU membership has been a major driver; negotiations are structured in 35 Chapters, including one on environment. The chapter on environment opened in late 2009, an indicator that Turkey will focus on filling gaps on environmental issues and on implementing new environmental legislation.

Biodiversity

In terms of biodiversity, Turkey resembles a small continent. Turkey has forest, mountain, steppe, wetland, coastal and marine ecosystems and different forms and combinations of these. It lies within three bio-geographical regions, the Euro-Siberian, the Mediterranean and the Irano-Turanian, and covers their transition zones. It lies at the bridge between two continents. It has diverse and rapidly changing climatic, geographical and topographical features. All these factors have combined to ensure a vast ecosystem, and species and genetic diversity.

Turkey has the richest flora of any country in the temperate zone. For example, whereas the entire continent of Europe has 12,500 gymnospermous and angiospermous plant species, Anatolia alone has a recorded 11,000 such species. The Eastern Anatolia and Southern Anatolia geographical regions, and the Irano-Turanian and Mediterranean regions, are known to be rich in endemic plant species, approximately one third of all flora species are endemic to Turkey.

Forest ecosystems cover a total area of 21 million ha corresponding to 27.2 % of total land area of the country. Broad-leaved forests are widespread in Turkey. Coniferous trees occur at all altitudes from sea level to the highest limit where forests exist. In the Aegean and Mediterranean regions, there are humid and semi-humid coniferous and dry forests (oak, black pine and red pine) as well as shrubs. These rich forest ecosystems provide habitats for a great number of endemic plant species, important bird species and other wildlife species. According to the results of the forest inventory, the area of forestland in Turkey has increased by nearly 1 million ha during the last 30 years[49].

As Turkey is located at the intersection of the Mediterranean and Near Eastern gene centers, it has important plant genetic resources. These two regions played a key role in the emergence of cereals and horticultural crops. In Turkey, there are 5 micro-gene centers in which more than 100 species display a wide variation and which are the centre of origin of a large number of important crop plants and other economically important plant species such as medical plants. These centers offer genetic resources for the future sustainability of many plant species cultivated across the world.

Fauna biological diversity is also high compared to other temperate zone countries. The total number of invertebrate species in Turkey is estimated to be about 19,000, of which about 4,000 species/subspecies are endemic. The total number of vertebrate species identified to date is near 1,500. Of these, over 100 species are endemic, including 70 species of fish. There are 161 species of mammals (37 endemic) and 460 species of birds. This diversity is partly due to the rich ecosystem diversity, and also due to the fact that Turkey lies on important on migration routes. For example, coastal and marine ecosystems provide a nesting area for 2 important species of sea turtle (*Caretta caretta* and *Chelonia mydas*). Table 1 provides information on the known number of species and the levels of endemicity. In addition, the numbers of rare and endangered species.

[49] Afforestation and Erosion Control Mobilization Action Plan 2008-2012.

Table 1 Overview of flora and fauna biodiversity species in Turkey

	Defined Species	Endemic Species	Rare and Endangered Species*	Extinct Species
Plant Groups				
Algae	2,150	-	unknown	unknown
Lichen	1,000	-	unknown	unknown
Moss	910	2	2	unknown
Pteridophytes Ferns	101	3	1	unknown
Gymnospermae	35	5	1	unknown
Monocotyledonous	1,765	420	180	-
Dicotyledonous	9,100	3,500	1,100	11
Animal Groups				
Vertebrates				
Reptiles/Amphibians	141	16	10	-
Birds	460	-	17	-
Mammals	161	37	23	7
Freshwater fish	236	70	-	4
Marine Fish	480	-	-	-
Invertebrates				
Mollusk	522	203	unknown	unknown
Butterflies	4,500	89	89	unknown
Locusts	600	270	-	-
Dragonflies/Damselflies	114	-	-	-
Beetles	~10,000	~3,000	-	-
Half-winged	~1,400	~200	-	-
Aphids	~1,500	~200	-	-

** The sum of Critically Endangered-CR and Endangered-EN according to IUCN-2001 criteria.*
Source: The National Biodiversity Strategy and Action Plan, 2007.

Turkey's biodiversity is under threat and degrading. Many of the endemic plants are faced with serious threats. According to the IUCN 2001 criteria, about 600 of Turkey's endemic species are in the category of "Critically Endangered" and about 700 in the category of "Endangered"[50]. Based on the IUCN criteria, *Caretta caretta* is "Vulnerable" and the *Chelonia mydas* is "Endangered."

Turkish stakeholders, notably governmental, have been taking steps to reverse biodiversity lost. Impressive steps have been taken in ex-situ conservation (conservation outside the natural habitat or artificial conservation)[51]. The gene banks at the Field Crops Central Research Institute and the Aegean Agricultural Research Institute, both of which are affiliated to the Ministry of Agriculture and Rural Affairs, have assumed the leading role in the ex-situ conservation of the wild relatives of crop plants and of other herbaceous plant species. Organizations affiliated to the Ministry of the Environment and Forestry, including the Forest Trees and Seeds Improvement Research Directorate, are responsible for the ex-situ conservation of forest trees[52]. For example, in the "Turkish Endemic Plants Project", implemented with the support of State Planning Organization between 1992 and 1997, seeds of many endemic plants were collected and placed under conservation at the Gene Bank of Menemen within the Aegean Institute of Agricultural Research affiliated to the Ministry of Agriculture and Rural Affairs[53].

Steps have also been taken to improve in-situ conservation. In-situ conservation areas are classified into National Parks, Nature Conservation Areas, Nature Parks, Wildlife Development Areas, Special Environmental Protection Zones, Natural Sites, Natural Assets and Gene Preservation and Management Areas. The proportion of land under various forms of protection for nature conservation has increased from 4% to about 6% since 2000, whereas, according to Kaya

[50] NBSAP, 2007, page 29.
[51] Ex-situ conservation means that species threatened by uncontrollable processes that cannot be managed by in-situ conservation can be conserved. However, the process of evolution is halted in ex-situ conservation since the interaction between the species and the environment does not continue.
[52] The National Biodiversity Strategy and Action Plan, 2007.
[53] The National Biological Diversity Strategy and Action Plan, 2007.

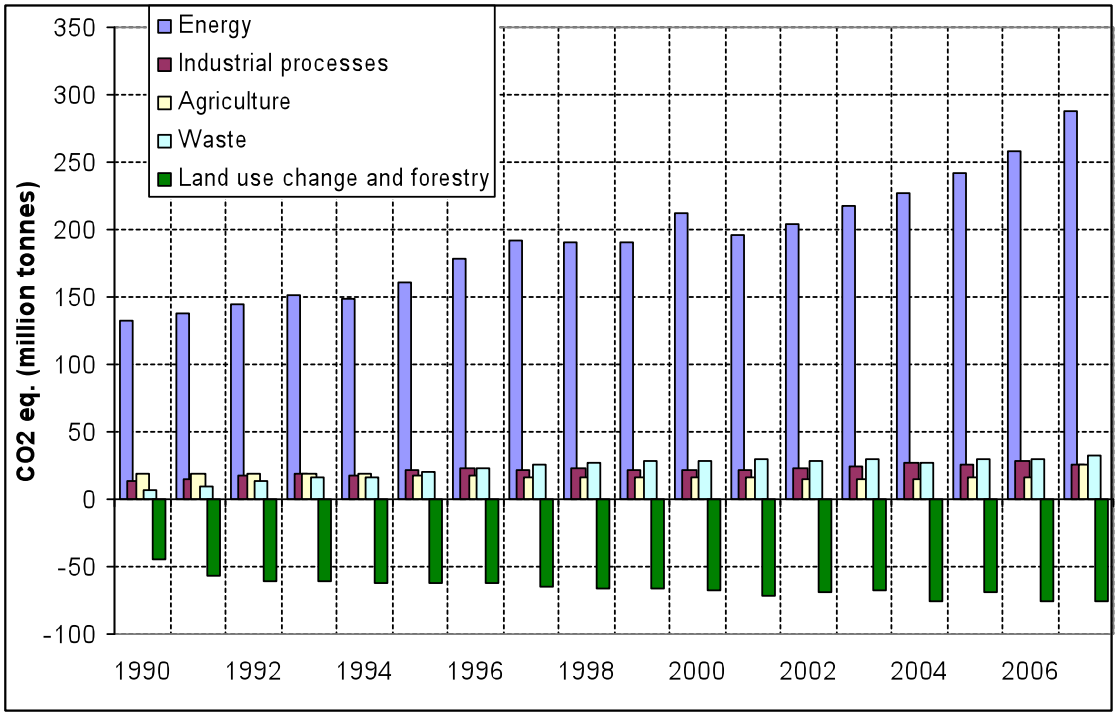
and Raynal (2001)[54] in the long term, 10% could be taken under protection if all projected conservation programs would be implemented. The approach to in-situ conservation has also been modified, with more involvement of local communities, possibly catalyzed by NGOs.

Climate Change

The United Nations Framework Convention on Climate Change (UNFCCC) came into force in Turkey on 24 May 2004. In January 2007, Turkey submitted its First National Communication to the UNFCCC. The latest National Inventory Report was submitted to UNFCCC in July 2009. This latter is based on the national greenhouse gas inventory in the sectors of energy, industrial processes, agriculture, land use change and forestry (LUCF), and waste. Finally, Turkey became part of the Kyoto protocol on 26 August 2009.

Figure 1 illustrates the evolution in GHG emissions by sector in the period 1990-2007.

Figure 1Greenhouse gas emission trends by sector in Turkey



Source: National Inventory Submissions 2009, www.UNFCCC.int

Figure 1 shows that GHG emissions increased considerably over the period 1990-2007 from 125 to 296 million metric tons of carbon dioxide (CO_2) equivalents. Clearly, the energy sector is by far the largest source of emissions, with agriculture, waste and industrial processes all emitting similar quantities. LUCF has been a major, and growing, sink. In the energy sector, according to EIA,[55] oil consumption, at 35 percent, accounted for the majority of Turkish energy consumption in 2006, followed by natural gas (29 percent), coal (25 percent), followed by hydroelectric and renewable consumption (11 percent).

Table 2 provides additional information on the gases emitted per sector in 2007. The main gases emitted are CO_2 (77 percent), methane (18 percent), and nitrous oxide (3 percent). Notably, CO_2 emissions from the energy and LUCF (as sink) sectors account for the majority of emissions.

Table 2 Main sources of Greenhouse Gas Emissions in Turkey in 2007 (Gigogram equivalent of CO_2 gases emitted)

[54] Kaya, Z. and D. J. Raynal (2001). 'Biodiversity and conservation of Turkish forests', Biological Conservation 97: 131–141.
[55] Energy Information Administration, Country Analysis Briefs on Turkey, www.eia.doe.gov

Source	CO_2	Methane	Nitrous oxide	Hydro-fluoro-carbons	Sulfur hexa-fluoride	Total	% of total
Energy	282.5	4.3	1.6			**288.3**	78%
Industrial processes	22.0	0.1		3.2	1.0	**25.2**	7%
Agriculture		18.2	8.1			**26.3**	7%
Land use change and forestry	-76.3					**-76.3**	-21%
Waste		31.8				**31.8**	9%
Total	**228.2**	**54.4**	**9.7**	**3.2**	**1.0**	**295.4**	**79%**
Percent	77%	18%	3%	1%	0%	**100%**	

Source: UNFCCC (2009a)

However, as can be seen in Table 3, Turkey's per capita greenhouse gas emissions are relatively low, when compared to EU and other countries. It should be noted that, compared to most EU countries, Turkey's emissions have been growing quite fast.

Table 3 International comparisons of trends in CO_2 emissions per capita 1990 – 2004 (t CO_2 per capita) - for selected countries

Country	1990	1995	2000	2001	2002	2003	2004
EU							
Belgium	10.1	10.5	10.0	9.3	8.9	9.9	9.7
Czech Republic	.	11.8	11.6	11.6	11.3	11.4	11.5
Denmark	9.7	10.6	8.7	9.0	8.9	10.1	9.8
Finland	10.3	10.7	10.0	10.9	11.7	13.1	12.6
France1)	6.4	6.0	6.0	6.3	6.2	6.1	6.2
Lithuania	.	4.4	3.4	3.6	3.6	3.7	3.9
Latvia	.	3.8	2.5	2.8	2.7	2.9	3.1
Hungary	5.8	5.8	5.3	5.6	5.6	5.8	5.7
Germany	12.4	10.2	9.7	10.0	9.7	9.8	9.8
Poland	9.1	9.0	7.8	7.9	7.7	8.0	8.0
United Kingdom	10.1	9.8	9.9	10.0	9.6	9.7	9.8
Sweden	5.8	5.3	5.2	5.3	6.1	5.9	5.9
Other countries							
Australia	16.5	17.3	17.6	16.7	16.0	15.9	16.3
China	2.1	2.6	2.6	2.7	2.8	3.3	3.8
Iran	3.9	4.3	5.3	5.5	5.6	5.9	6.3
Japan	8.7	9.1	9.5	9.4	9.5	9.6	9.8
Republic of Korea	5.6	8.3	9.2	9.3	9.4	9.6	9.8
Kuwait	20.3	31.6	37.1	34.1	31.9	36.3	38.0
Norway	7.8	8.5	9.9	11.6	15.8	18.0	19.0
Saudi Arabia	15.7	13.4	13.1	13.3	13.6	13.6	13.4
Singapore	15.0	13.5	14.1	13.8	13.3	11.3	12.2
United States of America3)	18.8	19.3	20.9	20.4	20.5	20.2	20.4
Turkey	2.6	2.7	3.3	2.9	3.0	3.1	3.1
Ukraine	.	8.4	6.3	6.4	6.4	7.1	7.0
OECD 4)	11.2	11.4	12.1	12.0	12.0	12.0	12.1

1) Including Monaco
2) Including San Marino
3) Including territories
4) Estimate based on population weighted average of the 29 out of 31 OECD countries as presented in this table.
Source: Fifth National Communication of the Czech Republic, 2009, page 50, http://unfccc.int/resource/docs/natc/czenc5.pdf

From Table 3, CO_2 emissions from the energy sector energy account for the largest share of total greenhouse gas emissions (76% in 2007, excluding LUCF). For that reason, the Turkish government decided to develop reduction scenarios for CO_2 emissions from the energy sector. Two scenarios of greenhouse gas emissions for Turkey for the

energy sector for the period 2010-2020 were prepared,[56] a reference case based on no additional policy measures and an alternative with demand side measures (DSM). Table 4 provides the breakdown of these two scenarios and the resulting reduction in greenhouse gas emissions for Turkey.

Table 4 Greenhouse Gas Emissions Mitigation in Turkey for 2010-2020

	Reference (no policy measures)			DSM (with policy measures)			Reduction		
Tg CO_2 eq	**2010**	**2015**	**2020**	**2010**	**2015**	**2020**	**2010**	**2015**	**2020**
Electric	117	152	223	110	141	185	7	12	37
Industry	116	147	198	108	129	169	8	18	29
Transport	60	80	103	60	80	103	0	0	0
Residential (other)	49	61	69	46	55	59	3	6	10
Agriculture	12	15	19	12	15	19	0	0	0
Supply	4	4	5	4	4	4	0	0	1
Total	**358**	**461**	**616**	**340**	**424**	**539**	**18**	**37**	**77**

Source: ROT (2007). "First National Communication on Climate Change, under the United Nations Framework Convention on Climate Change", January 2007, Republic of Turkey http://unfccc.int/resource/docs/natc/turnc1.pdf

In the Reference scenario, greenhouse gas emissions in the energy sector originate from electricity generation (34%), industry (32%), transport (17%), and other (17%). The projected increase in greenhouse gas emissions in Turkey in the Reference scenario is mainly driven by the high GDP growth rate target as set by SPO. Clearly, from Table 4, it follows that the greatest opportunities for greenhouse gas emissions mitigation lie in electricity generation and industrial direct consumption of energy, with some opportunities in the residential sector. The contribution of renewable energy on the supply side is projected to be marginal with a mere 1% of reduction.

More scenarios and reduction possibilities are expected to be presented in the next National Communication to the UNFCCC.

Turkey has already taken many policy steps that could have an impact on emissions (see Box).

Framework policies and cross-sectoral measures affecting GHG emissions

Energy taxation: Turkey applies comparably high taxes for the use of mineral oil products, especially for transport fuels, where tax rates are among the highest in the world

Support of research and development: New technology and mitigation projects of the TUBITAK-MAM Energy Institute in the fields of carbonate fuel cells, microgas turbines, hydrogen and renewable energy technologies

Harmonization of Turkish environmental legislation with European Union (EU) laws: Improvement of air quality standards and emissions control measures

Policies and measures by sector:

Energy

Energy supply security Diversification of energy sources, e.g. by promoting domestic resources (hydropower, but also lignite); fuel switch to natural gas
Combined heat and power generation Up to 20 per cent of electricity from auto producers may be fed into the public electricity grid in accordance with the Energy Market Law
Renewable energy sources RES Law (2005); certified electricity from renewable energy sources; feed-in tariffs and obligations; obligatory prioritized use of geothermal energy at the local level, where resources are available
Energy efficiency improvements Energy Efficiency Law (2007); amendment of building regulations; appliance standards and labeling; targets for reducing energy intensity; rehabilitation of power plants; public campaign launched in 2007 on energy efficiency and awareness-raising

[56] UNDP and WB (2000) also called for studying scenarios in the energy sector in Turkey in: "Turkey, Energy and the Environment, Issues and Options Paper", ESM229.

Transport

Vehicle and fuel taxes Special consumption tax, favoring less cylinder capacity/lower fuel consuming passenger cars

Alternative vehicle fuels Promotion of alternative fuels (liquefied petroleum gas, compressed natural gas, ethanol etc.), fuel quality improvements (EU directive on quality of petrol and diesel fuels) and increased use of biofuels

Public transport systems Public transport improvements in main urban areas (Istanbul, Ankara, Izmir)

Integrated transport planning Major investments in rail infrastructure and harbors

Industry

Energy efficiency improvements Regulation (1995) on energy management systems for industry installations with annual energy consumption of 2,000 tonnes of oil equivalent or more; financial incentives (soft loans) for energy-saving investments in small and medium-sized enterprises

Integrated prevention and pollution control Use of best available technologies and techniques

Agriculture: Agriculture Strategy Paper (2006–2010 Sustainable Agriculture Measures); the Agricultural Reform Implementation Project; the Organic Agriculture Law No. 5262; Livestock Decree No. 2005/8503

Waste: Introduction of landfill and recycling methods; raising public awareness among the local administrations and the public regarding solid waste recycling; increase the share of municipalities with landfill facilities

Forestry: The Turkish National Forest Programme 2004–2023; Afforestation and Soil Erosion Mobilisation Action Plan 2008–2012.

Source: UNFCCC (2009). 'Report of the in-depth review of the first national communication of Turkey'. 3 December 2009, No. FCCC/IDR.1/TR. http://unfccc.int/resource/docs/2009/idr/tur01.pdf

Turkey continues to seek ways to reduce emissions by increasing energy efficiency and increasing the role of renewable energies. In Turkey energy efficiency is rising in priority on the policy agenda. Energy efficiency contributes to increasing energy supply security, maintaining a high level of GDP growth and overcoming environmental concerns with the main driver being climate change. Legislation on energy efficiency has recently been formulated and implemented. The next step in the process is to encourage investments in energy efficiency using market mechanisms. Moreover, three forthcoming GEF projects focus on energy efficiency. Finally, ongoing and upcoming financing facilities of the World Bank, Kreditanstalt für Wiederaufbau (KfW), EIB and EBRD, are to work in collaboration with local banks on energy efficiency and renewable energy.

Renewable energy, mainly hydro, wind, geothermal and solar, has the following potential in Turkey: [57,58]

- Economically feasible hydropower has a potential of about 170 TWh/year. Currently about 36 % of this has been exploited;
- According to the Turkey Wind Atlas, there is an economic wind potential of 48 GW, and currently about 2% has been exploited;
- The economic potential for geothermal is 3 GW of electricity (3% exploited). The main benefit could come from heat supply with a potential of 30 GW.
- The economic thermal potential of solar energy is estimated 131 TWh/year by the Electrical Power Resources Survey and Development Administration (EIE), corresponding to 300 million m² collector surface. However, solar electricity generation currently costs over 3 times the above three renewable energy sources.

Overall, renewable energies currently account for about 5.4% of total consumption in Turkey. Two-thirds of this amount comes from hydro energy, including large-scale dams. Total installed hydro capacity reached 14,507 MW as of January 2010, accounting 32% of the installed capacity, but the share of hydro was 18% of total generation in 2009. Next, installed wind energy capacity reached 803 MW as of January 2010. There are also four geothermal power plants with a total capacity of 77 MW and there is currently 0.5 MW isolated solar PV panels in Turkey. Most of the solar energy applications are in traditional hot water collectors - Turkey is the leading country in Europe with over 11 million square meters.

[57] Wirtschaftskammer Österreich, Environmental Technology Market Turkey, Environmental Policies, Strategies and programmers.

[58] The more technical potential of renewable energy resources is presented by R. Yilmaz, 2006, Evaluation of energy sources and sustainable development planning of Turkey, Journal of Applied Sciences 6(5): 983-987

With regards to *vulnerability* to climate change, Turkey has made a start on developing the targeted *adaptation* measures that are needed to deal with the effects of climate change. However, there is still a lot of work to be done in that direction, where costs of these adaptation measures need to be assessed. The main impacts and vulnerabilities identified by Turkey are (UNDP, 2009):

(a) increased risk of drought, with Turkey being one of the most vulnerable countries in this regard;
(b) decreased per capita water availability (concurrent with increased demand for water);
(c) increase in the frequency and intensity of floods associated with extreme rainfall events;
(d) increased risk of desertification, particularly in South-East Anatolia and the continental interior; and
(e) loss of biodiversity in several ecosystems where case studies were performed.

Several case studies under the first National Communication assessed other possible vulnerabilities (e.g. increased frequency of malaria or Crimean-Congo hemorrhagic fever, sea level rise), but did not reach clear conclusions.

International Waters

Turkey is a country with an extensive coverage of international waters, surrounded by the Black Sea on the north, the Aegean Sea in the west, the Mediterranean Sea in the South. Considering the average surface water run-off which is 186 billion m^3 (bcm)/year with the surface runoff of 7 bcm/year coming from neighboring countries, the total surface run-off from the country is 193 bcm/year. Moreover, the average amount of ground-water leakage is 41 bcm/year, (giving a total renewable water resources of 234 bcm/year). However, due to economic and technical reasons, not all renewable water resources can be utilized. Exploitable portions of surface run-off including inflow from bordering countries, and groundwater, are 98 and 14 bcm/year respectively. Thus, the total of economically exploitable water resources is 112 bcm/year[59]. This groups Turkey among the countries with low fresh water resources with a yearly per capita availability of fresh water of about 1,500 m^3 while this is about 10,000 m^3 for Europe and North America and about 2,100 m^3 in Iraq.

International Freshwater Resources

Turkey can be divided into 25 large river basins, five of which are transboundary: Euphrates and Tigris (Fırat and Dicle), Coruh, Kura-Araks, Maritsa-Ergene and Orontes. Each river has a considerable variation in annual run-off and precipitation and evaporation, although Table 5 provides mean flow figures. The total catchment area of these international basins is over 250,000 km^2, i.e. almost one third of Turkey, and they represent over one third of Turkey's renewable water resources. The Table below provides basic information on these transboundary river basins.

For the Maritsa-Ergene and Orontes rivers, Turkey lies in the downstream areas, and its water resources, both quality and quantity, can be affected by upstream uses in other countries. For the Euphrates, Tigris, Coruh and Kura-Araks rivers, Turkey lies in the upstream areas. In these cases, the use of water resources in Turkey may affect the quality and quantity of water in downstream states.

Table 5: Water potential generated in Turkey's transboundary river basins

Transboundary River Basins	Turkey's Position	Catchment area in Turkey (km^2)	Mean annual flow generated in Turkey (bcm)	Share of total usable potential
Euphrates and Tigris (Fırat and Dicle)	Upstream	184,918	52.94	28.5
Çoruh	Upstream	19,872	6.30	3.4
Kura-Araks	Upstream	27,548	4.63	2.5
Maritsa-Ergene	Downstream	14,560	1.33	0.7
Orontes	Downstream	7,796	1.17	0.6
Total usable water: surface water: groundwater:		112 bcm 98 bcm 14 bcm		

Source: General Directorate of State Hydraulic Works (DSI)

Euphrates and Tigris Rivers are located in eastern Turkey and are generally regarded as one basin because they merge before joining the sea at the Arabic-Persian Gulf. These rivers account for 28.5 % of Turkey's total surface water flow,

[59] Turkey Water Report, 2009, http://www.dsi.gov.tr/english/pdf_files/TurkeyWaterReport.pdf

occupying the largest catchment area and highest mean annual flow generated in Turkey. The area around Tigris and the Euphrates are very fertile and historically, the area is known as Mesopotamia meaning "the land between two rivers". The two rivers have several small tributaries of shallow freshwater lakes, swamps, and marshes which are extremely important to the ecology of the basin area and most of these are in Turkey.

Dams, hydropower plants for electricity generation, and irrigation channels to increase agricultural productivity have been constructed on the Euphrates and the Tigris. However, negative environmental impacts have also been observed, posing serious threats to the area's wildlife populations and causing the destruction of the natural habitat. The seasonal flow and sediment transport of rivers to downstream countries are affected with an impact on fish migrations leading to an unquantifiable loss in freshwater biodiversity and inland fishery resources. Due to the decline in biodiversity of the entire region, the number of migratory birds, fish and shrimp numbers have declined, not only in the marshes but all the way to the Persian Gulf and Iraq's river systems to such an extent as to become endangered (Carpenter & Ozernoy, 2003)[60].

The issue of reallocation of water flows due to dam construction and irrigation works is of particular importance in the Euphrates/Tigris catchment, due to the great potential of hydro generation capacity and the international sensitivity of water issues with southern neighbors, which depend to a large extent on freshwater supply from Turkey. Therefore hydro resources are developed with great care, taking into account the strategic value of water with neighboring countries, but also taking into account the impact on the environment.

Wetlands in the region are faced with a rapid desiccation causing significant changes on the regional micro-climate. Saline return drainage from irrigated lands and dam retention of sediment and nutrients negatively affects marshland fertility and ecosystem processes, contributing to habitat loss and degradation. Therefore, the degradation of the ecosystem may have serious consequences on human health, ranging from the results of water scarcity and pollution to increased exposure to thermal extremes.

The Çoruh River, the longest river of the East Black Sea region, is located in northeast Turkey and flows into the Black Sea from Georgia. Approximately 91% of the basin's drainage area is in Turkey while Georgia's share amounts to 9%. The surrounding area of the Çoruh River lies within the Caucasus ecological zone and is considered to be a key biodiversity area with numerous endemic species of flora and fauna. Regular joint technical meetings are held between Turkish and Georgian experts concerning the construction of dams in Turkey. Necessary measures have been taken to ensure that such water infrastructure projects are realized and run in an environmentally manageable and socially acceptable manner. As the flow of the Çoruh is erratic, the dams which have been built and are under construction in Turkey will benefit both sides by helping to regulate the flow of water.

Kura- Araks River basin is the largest in the South Caucasus. It originates in northeast Turkey. The watershed extends over 64 % of the territory of the South Caucasus states including five countries: Turkey, Iran, Armenia, Georgia, and Azerbaijan and flows in the Caspian Sea. A variety of climates, precipitation conditions and landscapes can be observed in the basin. Turkey, as an upstream state, causes only a minor share of the rivers' pollution while watershed degradation, erosion and agricultural pollution (chemicals, pesticides) are issues of concern. Erosion and sedimentation which are aggravated by deforestation and flood irrigation are other important water management issues in the basin.

Maritsa-Ergene River system rises in Bulgaria and flows along the Turkish Greek border into the Aegean Sea. The river forms an alluvial delta of about 188 km^2 where it enters into the Aegean Sea near the Gulf of Saroz. The climate is continental with cold rainy winters and dry and hot summers. Water quality in the basin suffers from agricultural run-off and the discharge of untreated waste-water. Nitrate loads up to 50 mg/l have been measured in the Maritsa. High organic pollution poses a threat to the protected basin delta due to domestic waste water discharges, discharges of organized industrial sites (textile, paper, and cement factories), waste from slaughterhouses and salt-sodium contained drainage waste from agriculture as well as low water quality in the basin.

The Orontes River originates in Lebanon and runs via Syria to Southern Turkey into the Mediterranean Sea. The total length of the river is 448 km of which the majority lies in Syria. It has been intensively used for irrigation purposes and domestic water supply. Because of the direct release of untreated waste water and the use of unsustainable traditional irrigation methods, the quality of groundwater and surface water is in continuous decline. The concentrated use of pesticides and fertilizers, disposal of industrial waste and large-scale groundwater abstraction has led to pollution while large-scale groundwater abstraction also increases salinity and a fall in groundwater levels (UN, 2008).

[60] Carpenter B. and Ozernoy I. (2003). *Water World: Marshes in Iraq in Process of Being Restored*, U.S. News & World Report.

The Water Report (2009) states that Turkey is expected to become a water stressed country by 2030 due to the growing population, rapid urbanization and industrialization. The amount of water per capita of Turkey is far below the average amount of water per capita in European countries. Hence, Turkey may need to use water resources sustainably, both at the nationally and internationally. Turkey has been keen to apply internationally agreed principles and to act in accordance with the requirements of environmental and social impact assessments during the utilization of transboundary rivers. In this context, Turkey has signed and ratified various conventions such as the Ramsar Convention on wetlands, the Convention for the Protection of the Mediterranean against Pollution and the Convention on the Protection of the Black Sea against Pollution.

International Marine Resources

The Black Sea is connected to the oceans via the Mediterranean Sea through the Bosporus, the Dardanelles and the Marmara Sea. The channel has an inflow of about 300 bcm of salty seawater to the Black Sea from the Mediterranean along the bottom layer and returns a mixture of seawater and freshwater with about 465 bcm in the upper layer. The Black Sea is more than 2,200 m deep and its catchment area is six times larger than its surface. Turkey has the second longest Black Sea coastline of 1,400 km long. 341 bcm of river water enters the Black Sea from land from more than twenty countries every year, where Europe's second largest river the Danube is the main tributary.[61]

The Black Sea is Turkey's most important fishing region, however nutrient pollution, organic pesticides, heavy metals, incidental and operational spills from oil vessels and ports, over-fishing and invasions of exotic species have been radically changing the ecosystem and threatening biodiversity. Terrestrial water flows are high and there is considerable surface water because of heavy rainfall and limited evaporation in the region.

Regional cooperation is manifested in the Convention on the Protection of the Black Sea Against Pollution (Bucharest Convention), in 1992 and ratified by all six Black Sea countries (Bulgaria, Georgia, Romania, Russian Federation, Turkey, Ukraine) at the beginning of 1994 (Kibaroglu, 2005), in order to reduce and control pollution in the Black Sea, protect and preserve the marine environment and to provide a legal framework for cooperation. The Black Sea Environmental Programme (BSEP) is supported by governments and international partners. The most important achievements of BSEP were the Transboundary Diagnostic Analyses and the regional Strategic Action Plan for the Rehabilitation and Protection of the Black Sea.

The Mediterranean Sea covers approximately 2.5 million km^2 with an average depth of 1,500 meters. It is bordered by three continents and 22 countries with a coastline of 46,000 km. The region is known for its particularly mild climate with uniform and moderate temperatures which creates a favorable environment for many different endemic species. The variety of flora is estimated at over 25,000 species representing a wealth of potential medicinal and culinary properties.

These nutrient rich lands around the Mediterranean coast attract two to five billion migratory birds each year. Approximately 6% of marine species in the world including some of the world's most endangered species, such as the monk seal can be found in the Mediterranean. It has been estimated by UNEP that 650 million tons of sewage, 129,000 tons of mineral oil, 60,000 tons of mercury, 3,800 tons of lead and 36,000 tons of phosphates are dumped into the Mediterranean each year. Pollution is one of the major problems due to rivers carrying substantial amounts of agricultural and industrial wastes as well as the low renewal rate of the water. These include areas of importance to tourism, such as the coast from Kemer to Alanya, as well as areas of biological importance such as the Goksu Delta and the Bay of Iskenderun (Kibaroğlu, 2005). Oil tanker traffic through this sea accounts for more than 20% of global traffic making the sea a major oil transportation route.

The Mediterranean Sea also faces problems due to mass tourism leading to degraded landscapes, soil erosion, increased waste discharges into the sea, loss of natural habitats, higher pressure on endangered species and heightened vulnerability to forest fires.

Being one of the narrowest and most winding water routes in the world and serving as a significant corridor between the Mediterranean Sea and the Black Sea, the Turkish Straits is at constant risk of accidents and pollution with around 55,000 vessels using the straits every year. Nearly 18% of those vessels are tankers carrying hazardous substances. The Undersecretariat of Maritime Affairs has initiated a project, the Establishment of Emergency Intervention Centre and the Identification of Current Situation at Turkey's Seas Project, to prevent the pollution of seas, protect the marine environment and intervene effectively with emergencies.

[61] Strategic Action Plan for the Environmental Protection and Rehabilitation of the Black Sea, 2009

Table 6 summarizes the importance of the two large international seas surrounding Turkey:

Table 6 Overview of international seas and their inflows.

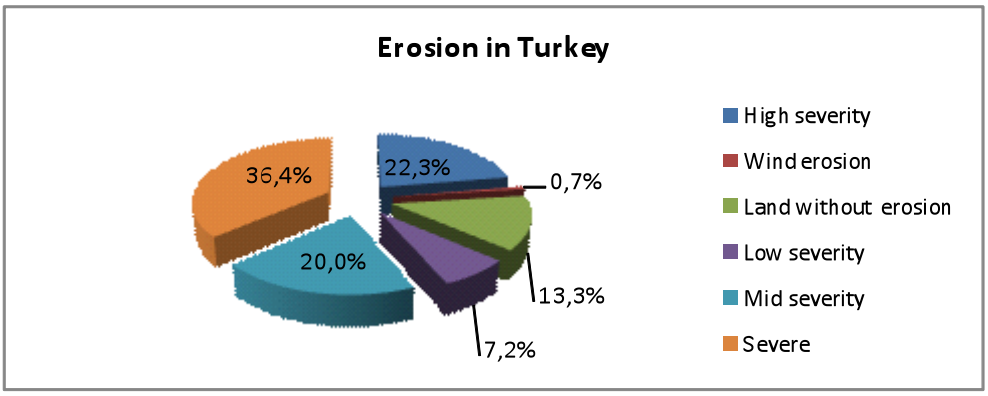
	Total Coastline (km)	Turkish Coastline (km)	% of coast in Turkey	Total inflow (bcm)	Inflow from Turkey (bcm)	% inflow from Turkey
Black sea	4,340	1,400	32%	341	36	11%
Mediterranean Sea	46,000	1,600	3%	255[62]	10	4%

Source: Struglia et al (2004) and inflow from Turkey into the Mediterranean Sea is based on an estimate.

Land Degradation

About 1/48th of all erosion in the world is happening in Turkey.[63] Land affected by desertification is one of the most serious problems in Turkey. The majority of the country's soils (81%) are exposed to the risk of erosion in varying levels of severity due to its diverse topography, deforestation and the dominant steep slopes. 46% of the total land has more than 40% slope and 62.5% has more than 15% slope. In addition, 72% of the soils are affected from water and wind erosion. It is shown on the World Desertification Risk Map that the Central Anatolian region is highly sensitive, and that approximately 500 million tons of soil is transported to the seas and lakes every year. The concentration of transported soil is greater than the amount in USA (7 times), Europe (17 times) and Africa (22 times).[64]

Figure 2. Erosion in Turkey



Source: MoEF, AGM, 2009, Combating with Desertification, http://www.agm.gov.tr/aindir/COLLESME_BROSUR_iNG.pdf

Turkey is among the leading countries in agricultural production with its total arable land of 28 million ha. Cultivated areas, most of which are located in steppe zones, constitute about 35 % of Turkey's total surface area. Of the total agricultural area, 70 % is formed by cropland, 5 % by orchards, 2.7 % by vegetable gardens, 2 % by vineyards and 2 % by olive groves. The remaining 18 % of the agricultural area is left fallow according to the cultivation pattern implemented in those regions. The productivity of the soils is limited by topographical, chemical (high calcium carbonate content, alkalinity and low organic matter), and physical (water logging, texture) attributes.

Factors contributing to land degradation in the country include: agricultural methods being practiced without soil conservation; misuse of lands such as soil sealing; soil exploitation and overuse of fertilizers and irrigation. Three million ha of forestlands require erosion precautions. Erosion has also negative impacts on reducing the life of dams through siltation, despite the abatement programs implemented to an area of 2.2 million ha (UNCCD, 2006)[65].

[62] Struglia, M. V. A. Mariotti, and A. Filograsso, 2004, River Discharge into the Mediterranean Sea: Climatology and Aspects of the Observed Variability, Journal of Climate 17: 4740–4751.

[63] TEMA Foundation (Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats), www.tema.org.tr

[64] TEMA Foundation (Turkish Foundation for Combating Soil Erosion, for Reforestation and the Protection of Natural Habitats), www.tema.org.tr

[65] Turkey's National Action Program on Combating on Desertification, 2006.

The overuse of the land without sustainable planning has caused the occurrence of degradation and eventually has led to a reduction in productivity and loss of soil. Most significantly, the degradation of the natural vegetation on sand dunes of the Eastern Mediterranean has resulted in the extinction of several endemic plant species. Excess irrigation and drainage deficiency caused salinity build up that has been observed mainly in the Ipsala-Edirne flood plain and the Sanliurfa-Harran plain. The Euphrates, Tigris and Van basins are in danger with over 75,000 ha facing salinity-alkalinity problems. The Euphrates Basin and the surrounding environment used to have dense forests, but the forest quality is currently very poor due to years of degradation activities. Human impact has resulted in a decline in the habitat as well as plant diversity. Other land degradation factors are: inappropriate urbanization, the pressure of tourism in the coastal areas, deforestation due to forest fires, the abuse of the natural resources and deficiency in land and production planning.

Erosion control was initiated in Turkey in 1955. In 1969 the General Directorate of Afforestation and Erosion Control was established to undertake measures. Erosion prevention techniques used include: terracing, wattle fence, fascine fence, non-irrigated wall sill, mixed sill, biological structures, afforestation and plantation[66]. In addition the General Directorate of Public Water Works and the Ministry of Agriculture and Rural Affairs undertake erosion control related to dam catchments and farm/rangelands respectively. Furthermore, Special Provincial Administrations and Municipalities undertake such work.

In order to overcome the problem of natural resource degradation, Watershed Rehabilitation Projects have been carried out with an objective to improve rangeland, forestry and agricultural activities by decreasing soil erosion and increasing soil fertility. The Eastern Anatolia Watershed Rehabilitation Project, Anatolia Watershed Rehabilitation Project and Çoruh River Rehabilitation Projects rehabilitated degraded natural resources with the participation of all relevant government agencies and local level.

Additional actions contributing to combating desertification include:

- Soil Conservation and Land Use Law was passed;
- A National Forestry Strategy and the Action Plan for Combating Agricultural Drought were prepared and put into practice;
- Management plans for wetlands were prepared; soil conservation and land use law was put into practice;
- Desertification Monitoring Project is carried out with Portugal and Italy by the coordination of the European Space Agency;
- Environmental Landscaping Plans (Land Use Plans) are prepared for 34 provinces and the plans will be completed for all provinces by the end of 2012.;
- Conservation forests are established for protection of catchments, prohibiting any practice that may lead to soil degradation;
- New methods are applied in catchment and afforestation studies to increase water quality and quantity;
- UNEP′s Campaign to "Plant a Billion Trees" was supported by providing 400 million seedlings;
- Various films, posters, brochures and printed documents, panels, classes for students at schools, sport tournaments, photograph exhibitions, special stamps and activities, etc. have been prepared in order to raise public awareness and provide information[67].

As a result of the efforts of all related institutions and by the coordination of the Ministry of Environment and Forestry, the Turkish National Action Program to Combat Desertification was completed in 2003. The National Action Plan, in line with the United Nations Convention to Combat Desertification, aimed at determining factors leading to desertification and the necessary measures to be taken to prevent and/or to reduce the negative impacts of desertification and drought.

Furthermore, the Afforestation and Erosion Control Mobilization Action Plan 2008-2012 was put in place in 2007 with the objective to plant 2.3 million seedlings by afforestation, rehabilitation, erosion control and rangeland rehabilitation in 2.3 million ha land within five years. The Action plan objective for 2008 was 420,000 hectares; however in 2008, in total 463,592 hectares land was planted with 305 million seedlings by MoEF, Public Bodies and Institutions, Private and Legal Entities and NGOs, according to the 2008 Realisations Report of MoEF/AGM.

Persistent Organic Pollutants (POPs)

[66] Ministry of Environment and Forestry, General Directorate of Afforestation and Erosion Control, *AGM Activities.*

[67] Ministry of Environment and Forestry, General Directorate of Afforestation and Erosion Control, *Combating with Desertification.*

POPs are one of the major problems threatening human health in Turkey. Twelve specific POPs have been recognized as causing adverse effects on humans and the ecosystem. These can be placed in three categories: Pesticides (DDT, aldrin, chlordane, dieldrin, endrin, heptachlor, hexachlorobenzene, mirex, toxaphene); industrial chemicals (polychlorinated biphenyls or PCBs); and industrial by-products (polychlorinated dibenzodioxins and polychlorinated dibenzofurans (usually referred to as dioxins and furans). It has been widely stressed that their elimination should be a priority for Turkey in the field of environment.

Turkey signed the Stockholm Convention Persistent Organic Pollutants in 2001, with the objective of protecting human health and environment, focusing on eliminating or reducing the releases of the 12 POPs. Under the Stockholm Convention, Turkey has an obligation to develop and implement a National Implementation Plan (NIP) that sets out how the Convention is being implemented in Turkey and outlines the next steps to be taken in the management of POPs. In Turkey, the NIP was developed in 2005 and the Stockholm Convention was ratified in October 2009. In obsolete stocks of Turkey, there are 10,930 kg DDT and 6,500 kg PCBs. Also approximately 77 tons of PCBs are being used by Turkish Electricity Generation and Transmission Corporation.

Turkey has taken many steps to implement the Convention. These initiatives include legislation, regulations, voluntary programs and standards, policies, programs and other related measures including action by Turkish authorities and the public. In addition, the MoEF has been appointed the POPs National Focal Point.

POPs is closely related to the management of industrial chemicals. Accordingly, the following legislative tools impact on POPs:

- The Environment Law (1983) and its subsequent controls, Control of Air Quality, Water Pollution Control, Soil Pollution Control, Solid Waste Control, Dangerous Waste Control, Medical Waste Control, Noise Control, Dangerous Chemicals and Environmental Audits
- The Regulation on Dangerous Chemicals provides framework for the determination of programmers, policies and principles regarding the control of dangerous chemicals in terms of production, packaging, storage, labeling and handling
- A dioxin/ furan limit value of 0.1 ng/m^3 was set for the hazardous, municipal and clinical waste incinerators by the regulation on the Dangerous Waste Control (25th September 1999, 23827)
- The Environmental Reference Laboratory, since 1998, has been carrying out the analysis of the items and/or pollutants specified in the Environmental Law and Regulations of Turkey

The issue of POPs was brought to the attention of the Turkish public more markedly in 2004 with the initiation of International POPs Elimination Project (IPEP). In 2005, Turkey, together with seventeen other countries, participated in a global campaign of the IPEP network “Keep the Promise – Eliminate POPs”, based on comparison of results of chemical analyses of chicken eggs for POP contents. Until now, six projects have been implemented under IPEP in order to attract active and effective civil society participation in preparations for the implementation of the Stockholm Convention. These projects are:

1. Pesticide stockpile in Derince, Kocaeli,
2. Petkim Petrochemical Co. PVC Plant, Egg sampling for POPs,
3. Contamination of chicken eggs near the hazardous waste incinerator in Izmit by dioxins, PCBs and hexachlorobenzene,
4. Global day of action on POPs in Turkey,
5. Public awareness-raising on POPs in Turkey,
6. Country situation report on POPs in Turkey.

TECHNICAL DOCUMENT C.

ROtI on In-Situ Conservation Project

1. Introduction

This review was carried out as part of the GEF Turkey country portfolio evaluation. This review aims at assessing concrete, measurable and verifiable results (outcomes and impacts) of the GEF in Turkey using an impact evaluation methodology being developed by the GEF Evaluation Office, called the Review of Outcomes to Impacts (ROtI).

The subject of this ROtI assessment is the In-Situ Conservation of Genetic Diversity ("GEF1" project), which was a Full-Sized GEF/World Bank project that was implemented between March 1993 and September 1998. The project fell under Operational Programmers 1 (Arid and Semi-Arid Zone Ecosystems) of the GEF Biodiversity Focal Area and had an approved budget of US$ 5.7 million. At project appraisal the GEF endorsed a grant of US$5.1 million, with co-financing of $0.6 million being an in-kind contribution from the Turkish Government. However, in spite of lack of familiarity with World Bank procedures, the project utilized 97% of all planned resources, making a total project cost of $5.46 million ($5.18 million GEF, and $0.28 million Government of Turkey).

The stated global environmental objective of the project was to '*identify, survey, inventory, and manage selected areas (Gene management zones-GMZs) for the In-Situ protection of the wild relatives of herbaceous and woody species with focus on globally significant species*', which was to be achieved as part of the project's overall objective, '*to test and develop a new approach to conservation of genetic diversity which has not been tried on a large scale anywhere in the world'*.

The project had the following five components:

(1) site surveys and inventories
(2) establishment of GMZs
(3) data management for the information acquired in (1) and (2)
(4) national plan for *In-Situ* conservation
(5) institutional strengthening

All components were financed by GEF. The project was executed over a period of five years, implemented by three ministries, namely MoF, MoE and MARA who had the overall responsibility for project implementation.

The Implementation Completion Report rated the project as highly satisfactory. The relevance and delivery of project outcomes was considered to be highly satisfactory and the sustainability of outcomes was assessed to be moderately likely (with risks identified regarding the development objective). This report seeks to assess whether the successfully completed project has in fact contributed to achieving lasting and beneficial environmental impacts.

The ROtI assessment involved desk research and meetings with key project stakeholders in Ankara, where consultations were conducted with individuals formerly involved in the project. The team leader, Wietze Lise, took responsibility for the overall country study report and also had responsibility for the two ROtI assessments (this World Bank/GEF In-Situ Conservation Project and a UNDP/GEF Initial National Communication project presented separately). Asım Açıkel and Aslı Çakın served as the national consultants, whereas Dennis Fenton served as the national consultant providing comments on the draft report. Annexes 2 and 3 set out Wietze Lise's itinerary and list of people consulted during the Ankara visits.

Concerning methodology, the evaluation team noted that an evaluation of a project that has been finalized more that 11 years ago is problematic; it is difficult to get the people together who worked on the project. It is difficult to have the project experts establish the linkage of project outcomes to impacts over such a long time period.

In this ROtI, the elements are first based on desk research and literature review. Consequently, each of the elements of the ToC, namely outcomes, impact drivers, assumptions, and intermediary states were discussed by bilateral interviews. A final workshop including all the key project stakeholders was held to double-check whether the gathered information could be supported by a group consensus.

The report is structured according to the ROtI methodology, starting with the characterization of the intended project environmental impacts, or GEBs (section 2). The logical sequence of conditions (i.e. theory of change) deemed

necessary to convert outcomes to impacts was then modeled (sections 3), followed by an assessment of the extent to which the outcomes-impacts pathways have been realized, which in turn provided an indirect measure of impact that is likely to be achieved over time (section 4). Section 5 provides a summary of the overall conclusions of the ROtI assessment.

2. The project's global environmental benefits

The starting point for the ROtI assessment is to identify the project's intended environmental impacts, which for GEF projects is the delivery of global environmental benefits (GEBs), which are defined in the ROtI handbook as *'lasting improvements in the status of an aspect of the global environment that safeguards environmental functioning and integrity as well as benefiting human society'*. The GEB for the In-Situ Conservation Project is "potentially developing new, more productive strains of economical and ecological important crops and trees", which would be achieved by protecting in-situ biodiversity of globally significant wild crop relatives of herbaceous and woody species (World Bank, 1993, page 38). This has been reformulated as **conserving existing and potentially developing new productive strains of economically and ecologically important crops and trees**.[68] This is globally significant in terms of conserved biodiversity of wild crop relatives of herbaceous and woody species, which is the aimed at threat reduction. Diverse geological and climatic conditions of Turkey have given rise to unique plant species represented nowhere else in the world. Over 30% of the 8,800 species found in the country are endemic to Turkey (World Bank, 1999). These numbers have been established as 9,477 vascular plants of which 2,762 are endemic (OECD, 2008). Many of these are relatives of important crop species that feed the world (wheat, barley, lentils, chickpeas, pasture plants and horticulture plants) and these are of global importance because of their unique genetic biodiversity (World Bank, 1993). In Turkey 1 billion seedlings have been planted in 2005-2007 in afforestation efforts and to combat soil erosion; protected areas is increasing and now accounts for 5.3% of Turkey's total land area (OECD, 2008). Three-quarters of all plant species existing in Europe also grow in Turkey. Wild relatives of many important agricultural plant species are of Turkish origin: cherry, apricot, almond, fig, wheat, chickpea, lentil, apple, pear, chestnut, pistachio and others. A total of 245 different grain types have been identified, including 95 wheat, 91 corn, 22 barley, 19 rice, 16 sorghum and 2 rye. Turkey is also the home of many ornamental species; more than 500 bulb plants live in Turkish waters (OECD, 2008).

In-situ programmers such as National Parks, Nature Conservation Areas, Nature Parks, Wildlife Development Areas, Special Environmental Protection Zones, Natural Sites, Natural Assets and Gene Preservation and Management Areas have been conducted in Turkey since the 1950s (ROT, 2008). In-situ and ex-situ conservation programmers need to be considered as two co-dependent activities. On the one hand, In-situ conservation will enable protection of genetic biodiversity and the natural evolution of new crops and trees, and for instance, more resistant to drought. On the other hand, this can be preserved and further utilized through Ex-Situ conservation. Whenever the genetic sources fail to reproduce Ex-Situ, fresh material can be collected from the in-situ conservation sites.

Major threats to genetic diversity are from agricultural, forestry and urbanization activities. The draft national plan for in-situ conservation mentions the following threats or factor reducing plant genetic diversity (Kaya et al, 1997):

- Agricultural activities
    - Plowing Pastures for Cultivation
    - Over Grazing in Pastures
    - Burning the Stubble
    - Excessive Use of Fertilizer and Chemical
    - Extension of High Yielding Cultivars
- Industrialization, Urbanization and Construction
- Collecting Plants From Nature
- Forestry Activities and Fires
- Tourism

The primary function of GMZs is the protection of genetic resources of either a single target species or entire community, but it could be also managed for other economic benefits such as grazing and timber harvesting as long as the other uses do not threaten the primary function of GMZ (Kaya et al, 1997). Hence, the GMZs do not need to be completely closed for human and animal usage, but the usage of them should be done in a planned and responsible manner. Taking critical forests and agricultural sites with a high degree of genetic diversity under conservation will reduce the threat on loss of genetic diversity.

[68] We reformulated the global environmental benefit to also include "conserving existing", because GMZs are primarily intended to conserve existing genetic material. However, as time passes, and evolutionary developments are taken into account, GMZs ultimately could also potentially lead to "new productive strains".

Turkish stakeholders, notably governmental, have been taking steps to reverse biodiversity lost. Impressive steps have been taken in ex-situ conservation (conservation outside the natural habitat or artificial conservation).[69] The gene banks at the Field Crops Central Research Institute and the Aegean Agricultural Research Institute, both of which are affiliated to the Ministry of Agriculture and Rural Affairs, have assumed the leading role in the ex-situ conservation of the wild relatives of crop plants and of other herbaceous plant species. Organizations affiliated to the Ministry of the Environment and Forestry, including the Forest Trees and Seeds Improvement Research Directorate, are responsible for the ex-situ conservation of forest trees (ROT, 2008). For example, in the "Turkish Endemic Plants Project", implemented with the support of State Planning Organization between 1992 and 1997, seeds of many endemic plants were collected and placed under conservation at the Gene Bank of Menemen within the Aegean Institute of Agricultural Research affiliated to the Ministry of Agriculture and Rural Affairs (ROT, 2008).

Steps have also been taken to improve in-situ conservation. In-situ conservation areas are classified into: National Parks, Nature Conservation Areas, Nature Parks, Wildlife Development Areas, Special Environmental Protection Zones, Natural Sites, Natural Assets and Gene Preservation and Management Areas. The proportion of land under various forms of protection for nature conservation has increased from 4% to about 6% since 2000, whereas, according to Kaya and Raynal (2001), in the long term, 10% could be taken under protection if all projected conservation programs would be implemented. The approach to in-situ conservation has also been modified, with more involvement of local communities, possibly catalyzed by NGOs.

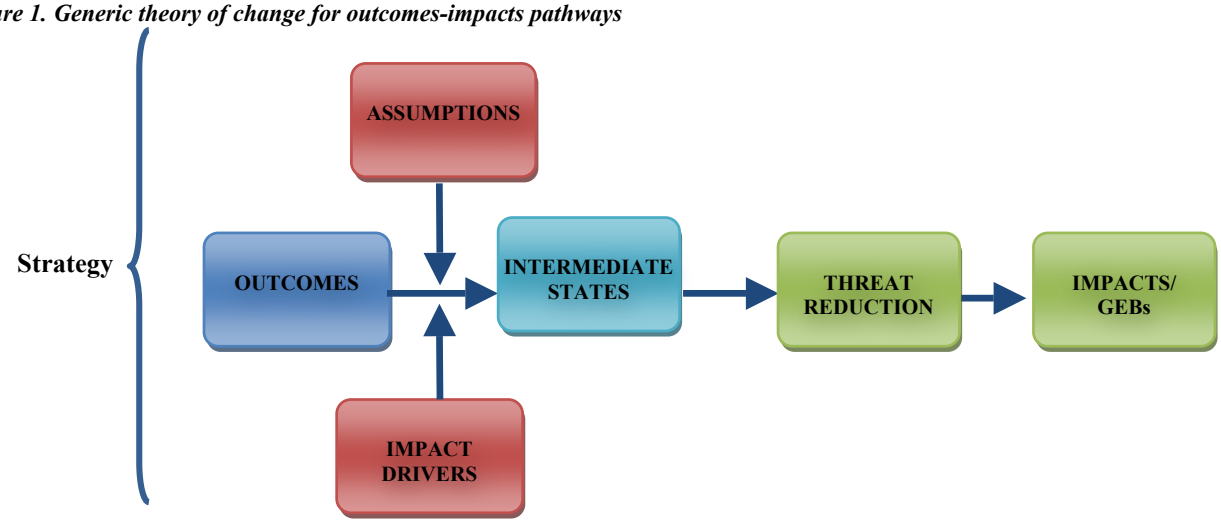
The next section identifies the theory of change deemed necessary to deliver the project's global environmental benefit, i.e. the improved protection and conservation of Turkey's of wild crop relatives of herbaceous and woody species.

3. The In-Situ Conservation outcomes-impacts theory of change

The theory of change for a project is the logical sequence of conditions and factors that are necessary to deliver the ultimate project impact. The basic project theory of change starts with activities and develops through a means-ends hierarchy until finally reaching impact. GEF project terminal evaluations assess the basic theory of change as far as outcomes, but do not usually go far in assessing the crucial last step to impact. The ROtI assessment focuses on this last step and develops and assesses a detailed theory of change between outcomes and impacts, referred to as ***outcomes-impacts pathways***. Each outcomes-impacts pathway represents a specific strategy. Figure 1 below illustrates the key elements and relationships for the detailed theory of change between outcomes and impacts.

[69] Ex-situ conservation means that species threatened by uncontrollable processes that cannot be managed by in-situ conservation, can be conserved. However, the process of evolution is halted in ex-situ conservation since the interaction between the species and the environment does not continue.

Figure 1. Generic theory of change for outcomes-impacts pathways



The key ingredients in the outcomes-impacts pathways (or strategies) that are examined by this ROtI are intermediate states, impact drivers and assumptions, which are defined in Table 1 below. And the way to achieve this is through threat reduction. If the project outcomes are assessed to be successfully delivered and the key ingredients of the theory of change between outcomes and impacts are in place, then it is reasonable to conclude that there is indirect evidence that the barriers and threats to impact have been overcome and that impact has or will be achieved with time.

Table 1. Definitions of theory of change elements in the outcomes-impacts pathways

ToC terms	Definition
Intermediate States (IS)	These are the transitional conditions between the project's outcomes and impacts that must be achieved in order to deliver the intended impacts
Impact Drivers (ID)	These are the significant factors that, if present, are expected to contribute to the ultimate realization of project impacts and that are within the ability of the project to influence
Assumptions (A)	These are the significant factors that, if present, are expected to contribute to the ultimate realization of project impacts, but that are largely beyond the power of the project to influence or address

The development of the In-Situ Conservation outcomes-impacts theory of change was based on reviewing project documentation and was validated in Ankara/Turkey with key informants. It should be noted here that the original project document (World Bank, 1993) has no log frame and there was also no project fiche, most probably due to this being the first GEF project in Turkey. The resulting project outcomes-impacts theory of change is presented in Table 2 overage, and Annex 5 provides a schematic of the model. An exact overview of the selected GMZs can be found in Table 3.

The three strategies are roughly in line with the project's five components, as stated above, but have been more specifically defined to reflect what is actually required to deliver the long-term vision of the strategy in terms of achieving the intermediate state and ultimate impact. For example, instead of "institutional strengthening" the strategy more precisely defines it as capacity building also including public awareness raising.

The outcomes falling under the three strategies have been re-organized and where necessary reworded from the original project brief to more clearly reflect the project's actual focus.

Table 2. The Genetic Diversity outcomes-impacts theory of change

Project strategies	Outcome	Impact Driver/Assumption	Intermediate State	Impact
	What was the situation at the end of the project?	**What are the key factors for delivery intermediate states?**	**What needs to happen, to achieve impacts?**	**What project ultimately aiming to achieve?**
STRATEGY #1: Gene Management Zones	Outcome 1: The selected 22 GMZs in Ceylan Pinar, Bolkar and Kaz mountains are taken under protection	A1a: Government will continue to be committed to the projects objectives and conserve the genetic diversity in the designated GMZs A1b: The need for people's alternating income generating activities is in place ID1: The GMZs will continue to be located within protected forests or state farms	IS1: Effective mechanisms and national funding for the sustainability of the conservation of genetic diversity continues to be provided	**LASTING IMPROVEMENTS ON THE STATE OF GLOBALLY SIGNIFICANT WILD CROP REALTIVES OF HERBACEOUS AND WOODY SPECIES AT NATIONAL LEVEL** ⬇ **CONSERVING EXISTING AND POTENTIALLY DEVELOPING NEW PRODUCTIVE STRAINS OF ECONOMICAL AND ECOLOGICAL IMPORTANT CROPS AND TREES**
	Outcome 2: GMZ Management Plans are adhered to, due to the selection of very remote GMZs	ID2: The national plan will identify the designation of new gene conservation zones after implementation A2: The collaboration established during the project continues		
	Outcome 3: National Plan for in-situ conservation are taken into consideration and are respected	A3a: There is no contradiction with existing legal framework A3b: Local people's views are reflected in the plans		
STRATEGY #2: Data management	Outcome 4: Survey/inventory and molecular characterization is used	A4: Survey/inventory and molecular characterization is a key reference in academic papers ID4: Scientific studies on the topic of in-situ preservation of genetic diversity continue	IS2: Data management and use is effective, readily available, and sustained to support genetic resource conservation	
	Outcome 5: Tagem maintains a "GIS and Remote Sensing Unit" responsible for data management	ID5: There is sufficient budget and personnel to maintain data on in-situ genetic diversity		
STRATEGY #3: Capacity building	Outcome 6: Public awareness about genetic resources strengthened	ID6: Capacity building activities continue to involve local people in in-situ genetic diversity conservation	IS3: Practical mechanisms have been created and effectively used to manage genetic resources	
	Outcome 7: Trained personnel of MoF, MoE and MARA use their knowledge	ID7: MoF, MoE and MARA continue to worked well together on genetic resources		

Table 3. GMZs established by the project

	Name	Size (ha)	Target species
	KAZ MOUNTAIN		
1	Alinoluk	385	Pinus nigra subsp. pallasiana
2	Ayigedigi	721	Abies nordmannia subsp. equitrojana, P. nigra, Castanea sativa
3	Engece Camlik	491	Pinus brutia
4	Gurgendag	621	A. nordmannia, P. nigra
5	Karakoy	528	P. nigra, P. brutia
6	Kilisealan	*	Prunus divericata
7	Mihlidere	385	C. sativa
8	Sarisu	*	P. divericata
9	Sivrikatran	*	C. sativa
10	Yukaricavus	*	P. divericata
	BOLKAR		
11	Asmacik	1,028	Pinus nigra subsp. pallasiana, Abies cilicicai, Cedrus libani**
12	Bahce	6,108	P. nigra, Pinus. brutia, C. libani**
13	Camliyayla	3,227	A. cilicicai, C. libani**
14	Karakoyak	1,196	P. brutia
15	Payam-Cocakdere	10,879	P. nigra, P. brutia, C. libani
	CEYLANPINAR STATE FARM		
16	Beyazkule	30	Aegilops speltoides var. speltoides, A. speltoides var. ligustica
17	Cavani	10	A. speltoides var. speltoides, A. speltoides var. ligustica, Aegilops tauschii
18	Gokcayi	9	A. tauschii
19	Gurgurbaba	35	Triticum dicoccoides, A. speltoides var. speltoides, A. speltoides var. ligustica, A. Tauschii
20	Horozmiran	30	A. tauschii
21	Saraccesme***	NA	A. speltoides var. speltoides, A. speltoides var. ligustica
22	Saraccestic***	30	Triticum monococcum

* Size of GMZ to be determined later

** GMZs for C. libani are provisional, pending results of isoenzyme analysis.

*** GMZ 21 and 22 are actually joined and the same.

Source: Krugman et al (2000).

4. Assessment of achievement of the outcomes-impacts pathways

The assessment of achievement of the outcomes-impact pathways was done based on a review of the project documentation and interviews with key informants. The assessment is presented by the three main strategies identified for achieving impact. The rating system used for the assessment is given in Table 4 below as per the ROtI Handbook, and is applied at the different levels of the Theory of Change; i.e. at the **individual ToC element level** (outcomes, impact drivers, assumptions and intermediate states) and at the **overall project level.**

Table 4. Field ROtI Rating System

Rating	Description
0	Not achieved
1	Poorly achieved
2	Partially achieved
3	Well achieved

The reporting for each strategy starts off by providing a justification for why the identified intermediate state and associated factors for the strategy are considered important in delivering ultimate impact. The theory of change for the strategy is then examined through its logical steps, firstly validating the extent to which the outcomes were achieved at project closure, followed by an assessment of the extent to which the impact drivers and assumptions have been realized. Each section concludes with an assessment of achievement of the intermediate state itself.

An overall observation is that this project was funded as a pilot project, and was implemented by MoF, MoE and MARA with the intention that, if successful, a follow-up phase would ensue. Following the favorable review of the project, MoF wrote a proposal in 1997 to the World Bank for a follow-up full-size GEF project (World Bank 2000), and this has become the second GEF funded national project.

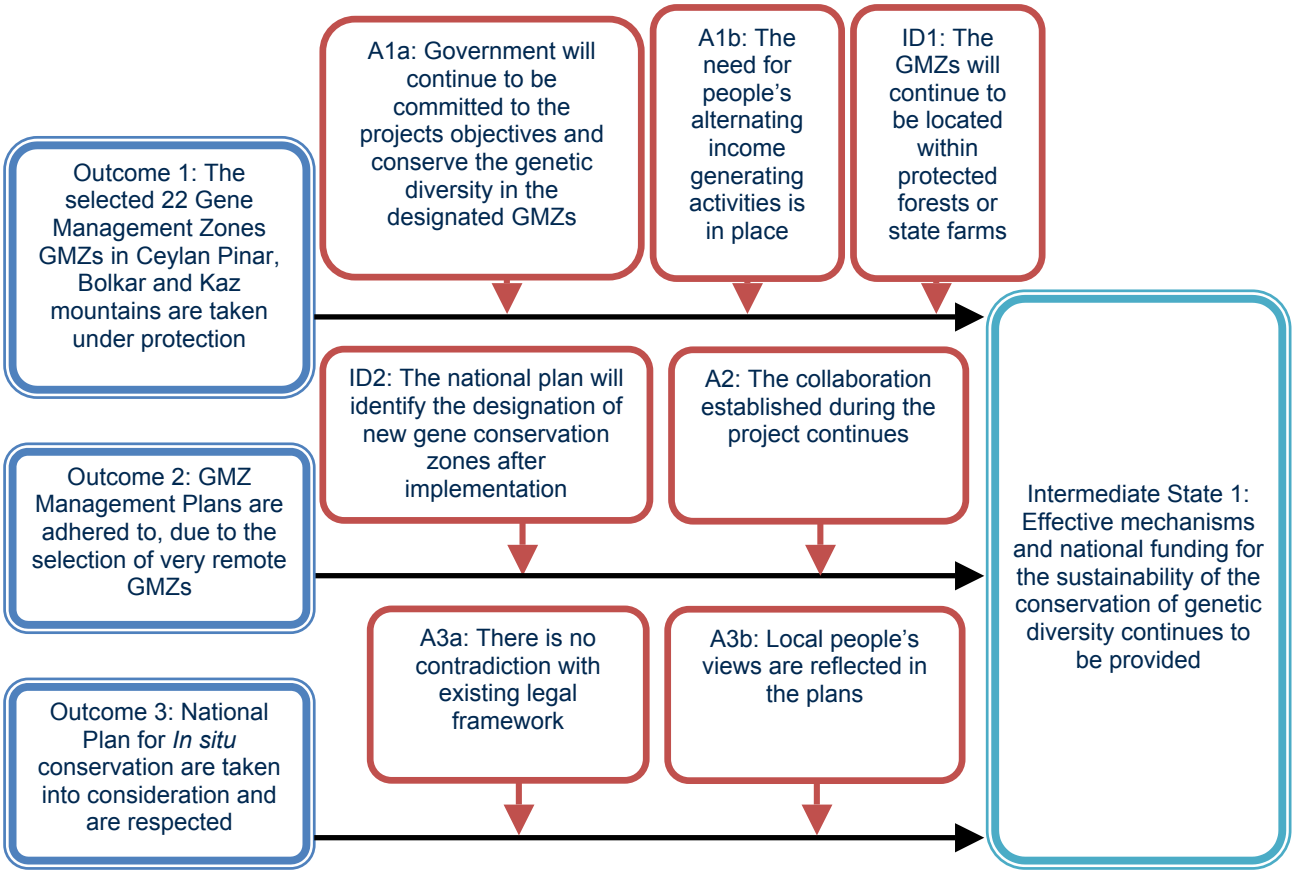
The follow-up project has been executed by MoF and the objective of the project is to establish effective, intersectoral, participatory planning and sustainable management of protected areas and natural resources at four selected biodiversity conservation demonstration sites, and build capacity at the national level to facilitate replication of these activities at priority conservation sites throughout Turkey (World Bank 2000). This is relating to all Strategies of the In-Situ Conservation Project, in the sense that forest protection is again aimed, although not in the explicit way at GMZs, and this is supported by management plans, a more general database on biodiversity is initiated in the project which is available through www.nuhungemisi.gov.tr, and capacity building is already an explicit objective of the project.

4.1 Strategy #1: Gene Management Zones

4.1.1 Theory of change overview

The GMZ strategy focuses on delivering the first intermediate state "*Effective mechanisms and national funding for the sustainability of the conservation of genetic diversity continues to be provided",* which was considered by the evaluation team to be an important ingredient to directly delivering the intended project impact, i.e. potentially developing new, more productive strains of economical and ecological important crops and trees (the GEB). The first intermediate state provides the financial basis for continuity to conserve genetic diversity in Turkey.

Figure 2. Theory of Change for Strategy #1



The project outcomes that the evaluation team identified as important for delivering this intermediate state are Outcomes #1, #2 and #3, as shown in Figure 2 above. These outcomes set out to provide a framework for managing GMZ by creating management plans for each individual GMZ, but also a national plan, where the actual conservation is taking place by the selection of very remote areas, within national parks for tree crops or state farms for agricultural crops.

Based on documentation and key informant consultations, the evaluation team identified two impact drivers and five assumptions that were deemed necessary to bridge the gap between the project outcomes and the delivery of the intermediate state, as shown in Figure 2 above. The first impact driver "*The GMZs will continue to be located within protected forests or state farms*" is regarded as necessary as this will guarantee the continued conservation of genetic diversity even if no active management would take place. The second impact driver "*The national plan will identify the designation of new gene conservation zones"* is needed to replicate the project's experiences to other areas and geographic zones. The first assumption "*Government will continue to conserve the genetic diversity in the designated GMZs by periodic monitoring*" is considered necessary for continuation of the GMZ conservation. The second assumption "*The need for people's alternating income generating activities is in place*" takes the needs of local people into account when protecting the GMZs, not jeopardizing their livelihood. The third assumption "*The collaboration established during the project continues*" is useful for the effective implement of the GMZ plans, this assumption mainly points out the institutional cooperation between MARA and MoE/MoF, which got merged into MoEF in 2003. The fourth assumption "*There is no contradiction with existing legal framework*" establishes the basis for implementation of the specific GMZ plans and the national plan. The final assumption, "*Local people's views are reflected in the plans*" would establish that the plans are not in contradiction with the local needs. The assumptions and impact drivers also contribute to ensure sufficient national funding as aimed at in the first intermediary state.

Table 5 assesses the extent to which the theory of change has been realized in theory and practice, by examining the achievement of the ToC components.

Table 5. Outcomes-impacts assessment findings for Strategy #1: Gene Management Zones

Theory of change component	Qualitative Assessment	Rating
Outcome #1: The selected 22 GMZs are protected **Outcome #2:** GMZ Management Plans are adhered to due to the selection of very remote GMZs **Outcomes #3:** National Plan for in-situ conservation is respected	▸ The GMZs are under protection because they are within government lands and forests. In situ preservation was new in the sense that both agricultural and forestry crops were preserved in a joint venture among MARA, MoE and MoF preserving genetic diversity. ▸ GMZ management plans have been drafted by MoF. It tells what to do to preserve the GMZ. In practice the plans are adhered to due to the selection of very remote areas and they are taken into account in planning forest activities. ▸ The national plan for in situ conservation shows the objectives and the way ahead. These are taken into consideration and respected and it was taken into consideration in formulating the 10 year forest master plan. This plan is often referred to, also by officers working in the field.	3
A1a: Government will continue to conserve the genetic diversity in the designated GMZs by periodic monitoring	▸ GMZ conservation is state responsibility and from time to time when ex situ breeding fails new material can be collected. GMZs are so isolated that they preserve original material, whereas, evolutionary changes may appear after yet another 10 years of conservation. ▸ GMZs are currently however not actively monitored and managed. Temporary management plans were drafted. No legal regulations have been put in place so implementation of GMZ management plans was not very much satisfactory.	2
A1b: The need for people's alternating income generating activities are in place	▸ This did happen sufficiently during the project, but then it was taken care in the next full sized project on biodiversity (GEF2), for instance it had a small grants component. ▸ Otherwise people would engage in grazing activities in the GMZs.	2
ID1: The GMZs will continue to be located within protected forests or state farms	▸ The surrounding forests and farmlands will continue to be classified as protected. ▸ In Bolkar and Kaz mountains there are villages located within GMZs, leading to some logging and grazing, not necessarily negatively affecting genetic diversity, as in some case it could even have a positive impact where some crops need grazing for reproduction.	2
ID2: The national plan will identify the designation of new gene conservation zones	▸ The concept of *in situ* conservation is replicated on-farm, where local, not wild, racial varieties are conserved and this too leads to preservation of (economically) important species. ▸ New gene conservation forests are created year by year, but they are not subjected to the same rigorous analysis as the GMZs. Also more forests are taken under protection, leading to an increase in forest under protection from 4% to 6%. ▸ This pilot project paved the way to many other projects in the field of biological diversity.	1
A2: The collaboration established during the project continues	▸ The in situ conservation project brought together MARA, MoE and MoF and even NGOs, this opened the way for cooperation, which still continues from time to time on project basis.	2
A3a: There is no contradiction with existing legal framework	▸ The National Plan for in-situ conservation has been written in such a way that overlaps and contradictions were avoided. ▸ All forest protection laws are under review to align it with EU regulations as part of the newly opened environmental chapter. ▸ The term GMZ is no longer used; the more common term is currently Gene Conservation Zone (GCZ). ▸ A draft biodiversity law has been prepared which foresees status and classification of GMZs.	3
A3b: Local people's views are reflected in the plans	▸ In Ceylanpinar the area is not populated, where some GMZs are close to the Syrian border and surrounded by mine zones. ▸ For Kaz and Bolkar mountains people were consulted and cooperative even though some villages needed their socio-economic problems to be solved.	2
IS1: Effective mechanisms and national funding for the sustainability of the conservation of genetic diversity continues to be provided	▸ Instead of a separate national fund, there is currently about 90-95% national funding as allocated by SPO; 70 projects with broader focus but also including genetic diversity, which are part of 3 large framework contracts on (1) genetic resources, (2) protection of biodiversity and (3) in situ conservation of threatened species. Another LIFE-EU project among MARA, MoE and NGOs has been completed in 2002. ▸ There is no explicit "fund", but projects are ongoing and are as such recognized as important by the government. ▸ There are clone banks and ex situ conservation, but these are not necessarily from the GMZs	2

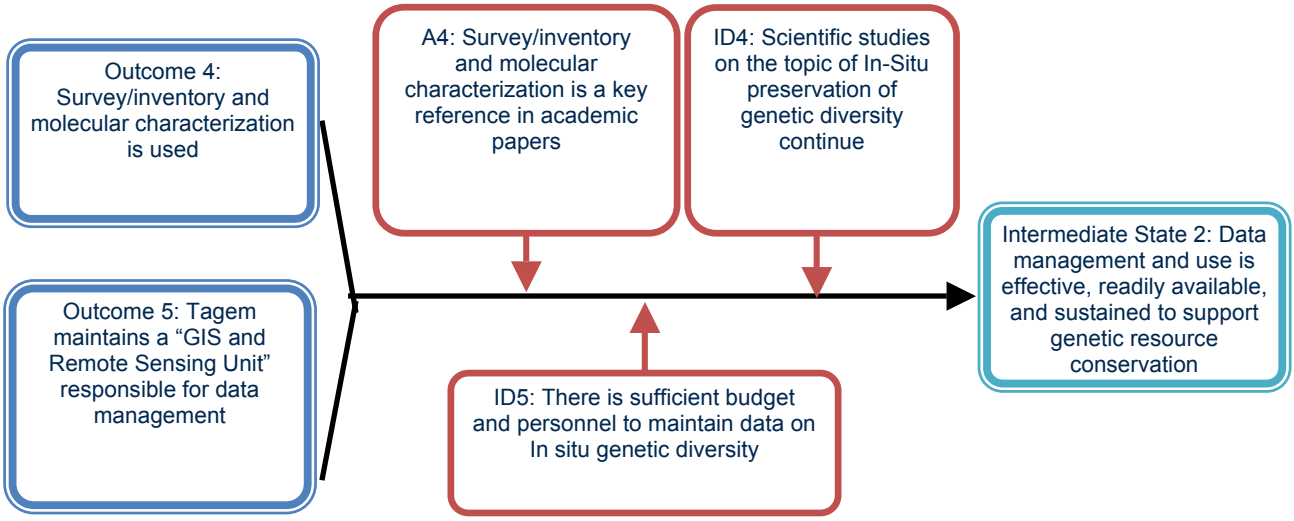
4.2 Strategy #2: Data management

4.2.1 Theory of change overview

The data management strategy focuses on delivering the second intermediate state *"Data management and use is effective, readily available, and sustained to support genetic resource conservation"*, which was considered by the evaluation team to be the second key ingredient to directly delivering the intended project impact.

The project outcomes that the evaluation team identified as important for delivering this intermediate state are Outcomes #4 and #5 as shown in 3 below.

Figure 3. Theory of Change for Strategy #2



Based on documentation and key informant consultations, the evaluation team identified two impact drivers and one external assumption that are deemed necessary to bridge the gap between the project outcomes and the delivery of the intermediate state, as shown in 0 above. The external assumption *"Survey/inventory and molecular characterization is a key reference in academic papers"* is regarded as a good reference for a pipeline of new projects in order to keep the database up to date. Hence, being the inventor of such a unique method has led to a track record that is needed to attract new funding possibilities in the form of new projects. The first impact driver "*Scientific studies on the topic of in-situ preservation of genetic diversity continue*" would show that the project would have lasting effects on creating the capacity to undertake scientific studies and to keep up to date on the latest development on the issues in the literature, leading to more informed way of data management. The second impact driver *"There is sufficient budget and personnel to maintain data on In situ genetic diversity"* is clearly essential as without funding the database on in situ conservation cannot be maintained.

Table 6 assesses the extent to which the theory of change has been realized by examining the achievement of the ToC components.

Table 6. Outcomes-impacts assessment findings for Strategy #2: Data management

Theory of change component	Qualitative Assessment	Rating
Outcome #4: Survey/inventory and molecular characterization is used **Outcome #5:** Tagem maintains a "GIS and Remote Sensing Unit" responsible for data management	▸ The isoenzyme method was initiated at the MoF and the MoF has now 4 active laboratories (see Annex 4). The method is still used, but other methods have emerged as well. At Tagem the more common method is now DNA or molecular characterization. There are four steps in molecular characterization: (1) characterize and keep the seed, (2) set up a system to learn from the plants, (3) breeding, (4) keep the original diversity under protection. ▸ There are currently 19 people employed in the GIS and Remote Sensing Unit at Tagem, this unit is also used for other purposes, depending on project demand and research needs at MARA.	3
A4: Survey/inventory and molecular characterization is a key reference in academic papers	▸ A couple of academic papers have been published, but especially the book with conference proceedings from the Antalya conference has become a key reference, where the isoenzyme method was a key innovation. With help of this conference Turkey earned prestige in the area of in situ conservation of genetic diversity.	2
ID4: Scientific studies on the topic of in-situ preservation of genetic diversity continue	▸ Scientific studies on the topic of in-situ preservation of genetic diversity did not continue, as after publishing 7 papers, no new papers have been published by the MoEF.	1
ID5: There is sufficient budget and personnel to maintain data on in-situ genetic diversity	▸ There is a database on agricultural species genetic diversity including in situ genetic conservation in Izmir. ▸ This is not yet created at Tagem. The information exists, but needs to be stored more structured in a database. A forthcoming project is aiming at a national database on genetic variety. This could not be created earlier due to limited budget.	2
Intermediate State #2: Data management and use is effective, readily available, and sustained to support genetic resource conservation	▸ This state is as of now partly achieved, but it is expected to be in place within a few years. ▸ European forest genetic resource (EUFORGEN) information system is being prepared with digital maps, info on genetic diversity and the size of species. ▸ The website www.nuhungemisi.gov.tr is a regularly updated database on biodiversity (outcome of the GEF2 project), but not specifically on genetic diversity.	2

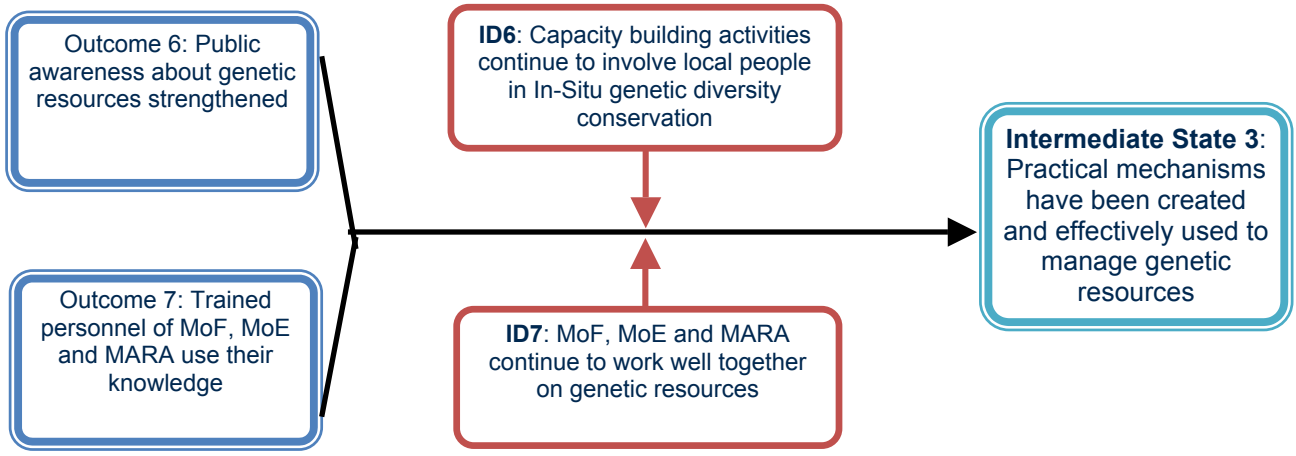
4.3 Strategy #3: Capacity building

4.3.1 Theory of change overview

The capacity building strategy focuses on delivering the third intermediate state "*Practical mechanisms have been created and effectively used to manage genetic resources",* which was considered by the evaluation team essential for sustainability of the conservation of genetic variety

The project outcomes that the evaluation team identified as important for delivering this intermediate state are Outcomes #6 and #7 as shown in 04 below. The outcomes focus on public awareness creation and training of personnel.

Figure 4. Theory of Change for Strategy #3



Based on documentation and key informant consultations, the evaluation team identified two impact drivers as requirements for bridging the gap between the project outcomes and the delivery of the intermediate state, as shown in 0 above. The first driver "*Capacity building activities continue to involve local people in in-situ genetic diversity conservation"* is needed to secure that GMZ conservation is in harmony with the local needs and practices. The second driver "*MoF, MoE and MARA continue to work well together on genetic resources"* would lead to a continuity on the line of work initiated by the in situ conservation project and would contribute to a sustainability of conservation efforts.

Table 7 assesses the extent to which the theory of change has been realized by examining the achievement of the ToC components.

Table 7. Outcomes-impacts assessment findings for Strategy #3: Capacity building

Theory of change component	Qualitative Assessment	Rating
Outcome #6: Public awareness about genetic resources strengthened **Outcome #7:** Trained personnel of MoF, MoE and MARA use their knowledge	▸ MoE was responsible for public awareness raising and in a series of workshops in villages attended by 20-50 people, have been able to obtain the cooperation of the local people and these were also an outlet to create awareness about the project. ▸ Before the in situ conservation project hardly anybody knew about genetic resources. In 2 places about 10 people worked on the issue. Now there are 23 places with over 80 people employed dealing with the issue. In addition, there is also a much wider cooperation now among NGOs, farmers, academics and the government. ▸ Hence, knowledge is spreading, also due to various training courses that were provided within the project at METU and led by Nigel Maxtet.	2
ID6: Capacity building activities continue to involve local people in in-situ genetic diversity conservation	▸ There is no need for people's participation in the selected GMZs, because they are located in national parks and state farm, but it may be helpful in the on-farm genetic conservation places, which is in effect the replication site of GMZs. ▸ In other areas people are cooperating, and the GMZs were not in areas that were used for harvesting by local communities. ▸ Local people are willing to participate. However, they also pointed out during the village meetings that their first need is for alternative income generation possibilities.	2
ID7: MoF, MoE and MARA continue to work well together on genetic resources	▸ MoEF and MARA are still working together, for instance on protected park projects and especially for genetic sources. MoEF and MARA also have signed a protocol, which is respected. ▸ The project was very effective in capacity building where 5 years of project could be compared to 50 years of work experience. However, this experience could not be transferred successfully to others.	2
Intermediate State #3: Practical mechanisms have been created and effectively used to manage genetic resources	▸ Tagem is the decision-making and coordination body for genetic sources. Moreover, three further outputs are expected: (a) A Ex-Situ gene bank is about to be realized at the premises of Tagem, (b) Tagem will obtain the technical responsibility, (c) A regulation will be published within a few months to register all genetic sources ▸ Over 20 new varieties of wheat have been created, which are more high yielding, drought and disease resistant and these are new preserved Ex-Situ as well, bringing the project one step closer to the stated impact.	2

5. Overall conclusions

Overall there has been reasonable success in progressing towards delivering the intended global environmental benefits of **conserving existing and potentially developing new productive strains of economically and ecologically important crops and trees**. No direct measures of the status of the global environmental benefit were attempted by the project (either by measuring conservation status or associated threats). This ROtI assessment is based purely on the validation and assessment of the delivery of the theory of change modeled above, which has been developed through consultation with the former project stakeholders in Turkey.

A final consolidated rating of the project's progress towards impact is given in Table 8 below (using the scoring system given in Table 4 above). It provides an assessment of the extent to which the project's theoretical design is in line with the validated theory of change deemed necessary for delivering impact and the progress towards delivering the outcomes-impacts pathways.

Table 8. Overall rating of project impact

	OUTCOMES - IMPACTS ASSESSMENT
Strategy 1: Gene Management Zones	2
Strategy 2: Data management	2
Strategy 3: Capacity building	2
Overall project	**2**
Rating description: a number of mechanisms were set in motion to achieve the Theory of Change after the GEF funding ended which has been providing a basis especially for national institutions to take the responsibility for following up on the project achievements.	

The project has been rated as highly satisfactory in the results in the Implementation Completion Report (World Bank, 1999). One of the concerns was the sustainability of the project beyond the frame of completion. The qualitative rating given by this ROtI assessment is "partially achieved" for all strategies and also for the project as a whole. This rating is justified by the fact that substantial progress toward impact is still observable today, this being largely due to the fact that GMZ in national parks and protected forests inherently imply effective in situ conservation. However, no active system was in place after the termination of the project to continue the efforts at the same level as was done during the project, especially on data management and scientific publications. As the selection of GMZ in national parks and protected forests inherently implies in situ conservation, the project is still on its way to deliver impact and achieve the stated global environmental benefit: *conserving existing and potentially developing new productive strains of economically and ecologically important crops and trees*. If achieving this impact for agricultural crops would take approximately another 10 years, for tree crops it could take another 40-50 years.

Annex 2: Turkey Country Study Itinerary 2009-2010

Friday 30 October
- Meeting at MoEF

Monday 9 November
- Meeting at MoEF

Monday 23 November
- Meeting at MoEF and visit to laboratory on ex situ genetic conservation at MoEF.

Friday 11 December
- Meetings at Tagem

Monday 21 December
- Meetings at Tagem

Wednesday 23 December
- Morning: Meetings at Tagem and visit to laboratory of Tagem and visit to seed breeding center and the upcoming gene bank at Tagem.
- Afternoon: Meetings at MoEF.

Friday 22 January
- ROtI workshop at Tagem, with participation of MARA, MoF and MoE.

Annex 3: People met

Date	People	Position, organization	
30/10/2009	Ercan VELİOĞLU	Forest Engineer	MoEF, Forest Tree Seeds and Tree Breeding Research Directorate
	Dr. Burcu ÇENGEL	Biologist	
9/11/2009	Salih AYAZ	Externally Supported Projects Division Director, MoEF, Foreign Relations and European Union Department	
23/11/2009	Ercan VELİOĞLU	Forest Engineer	MoEF, Forest Tree Seeds and Tree Breeding Research Directorate
	Dr. Burcu ÇENGEL	Biologist	
	Dr. Hikmet ÖZTÜRK	Deputy Director	
	Prof. Dr. Zeki KAYA	Head Department of Biological Sciences	Middle East Technical University
11/12/2009	Dr. Vehbi ESER	Head of Department	MARA, General Directorate of Agricultural Research Field Crops Research Department (Tagem)
	Dr. Muzaffer KIZILTAN	Assistant General Director	
	Dr. Arzu ÜNAL	Biologist	
	Birgül GÜNER	Agricultural Engineer	
21/12/2009	Dr. Arzu ÜNAL	Biologist	MARA, General Directorate of Agricultural Research Field Crops Research Department (Tagem)
	Birgül GÜNER	Agricultural Engineer	
	Dr Meral PEŞKİRCİOĞLU	GIS expert	
23/12/2009	Dr. Arzu ÜNAL	Biologist	MARA, General Directorate of Agricultural Research Field Crops Research Department (Tagem)
	Birgül GÜNER	Agricultural Engineer	
	Dr Meral PEŞKİRCİOĞLU	GIS expert	
	Dr. Vehbi ESER	Head of Department	
	Dr Taner AKAR	Wheat expert	
	Muzaffer SÜREK	Consultant	Retired
	Hasan ÖZER	Division Manager	MoEF, Forest Tree Seeds and Tree Breeding Research Directorate
	Cemil ÜN	Head of Forest Cartography and Photogrammetry	MoEF, Forest Cartography and Photogrammetry Department
	Mehmet DEMİR	Chairman of Integration Unit	
22/1/2010	Tülay M. KOCAMAN	Engineer	MoEF
	Ergül TERZİOĞLU	Biologist	MoEF General Directorate of Nature Protection and National Parks
	Ersin ÖZEK	Engineer	MoEF
	Dr. Meral PEŞKİRCİOĞLU	Engineer	Field Crops Central Research Institute
	Muzaffer SÜREK	Retired	MARA – Tagem
	Hasan ÖZER	Division Manager	MoEF Department of Research And Development -Central Anatolia Forestry Research Institute
	Burcu TARIKAHYA	Engineer	MARA
	Yrd. Doç. Dr. Alptekin KARAGÖZ	Assistant Prof.	Aksaray University
	Ercan VELİOĞLU	Chief Engineer -Forest Engineer	MoEF, Department of Research And Development- Forest Tree Seeds and Tree Breeding Research Directorate
	Dr. Burcu ÇENGEL	Biologist	

	Dr. Nihal ÖZEL	Biologist	Egean Forestry Research Center
	Gülseren ÇAĞLAR	Engineer	MoEF, ARGE
	Birgül GÜNER	Agricultural Engineer	MARA – Tagem
	Dr. Arzu ÜNAL	Biologist	MARA – Tagem

Annex 4: Photos of visits in Ankara

Photo 1: Ex situ conservation lab at MoEF

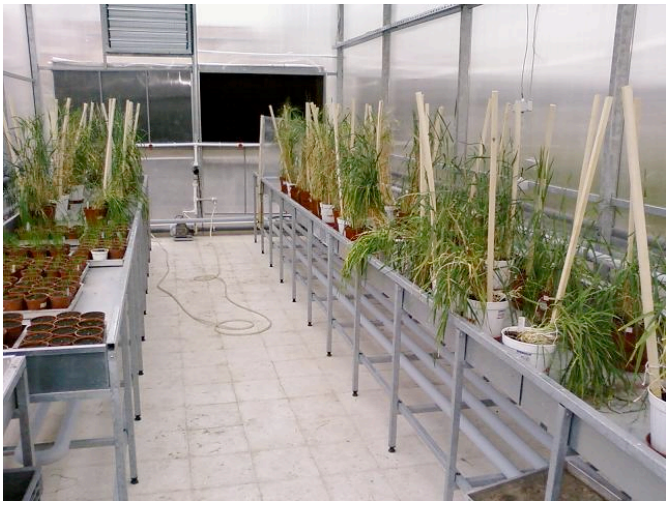


Photo 2: Ex situ cultivation of new wheat and barley species at Tagem

Photo 3: Ex situ conservation lab at Tagem

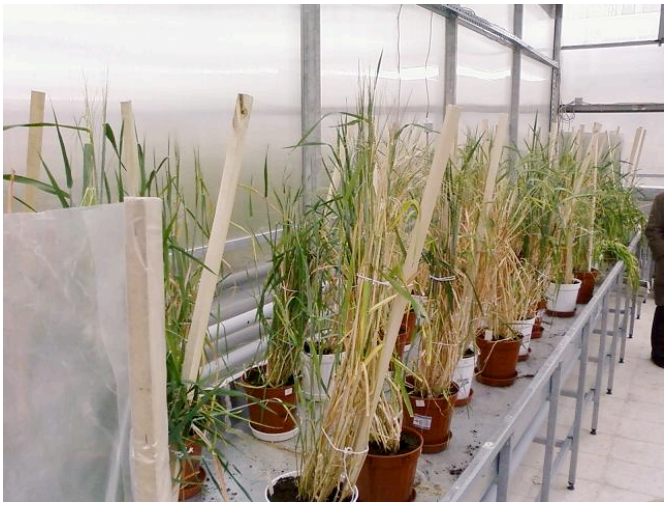
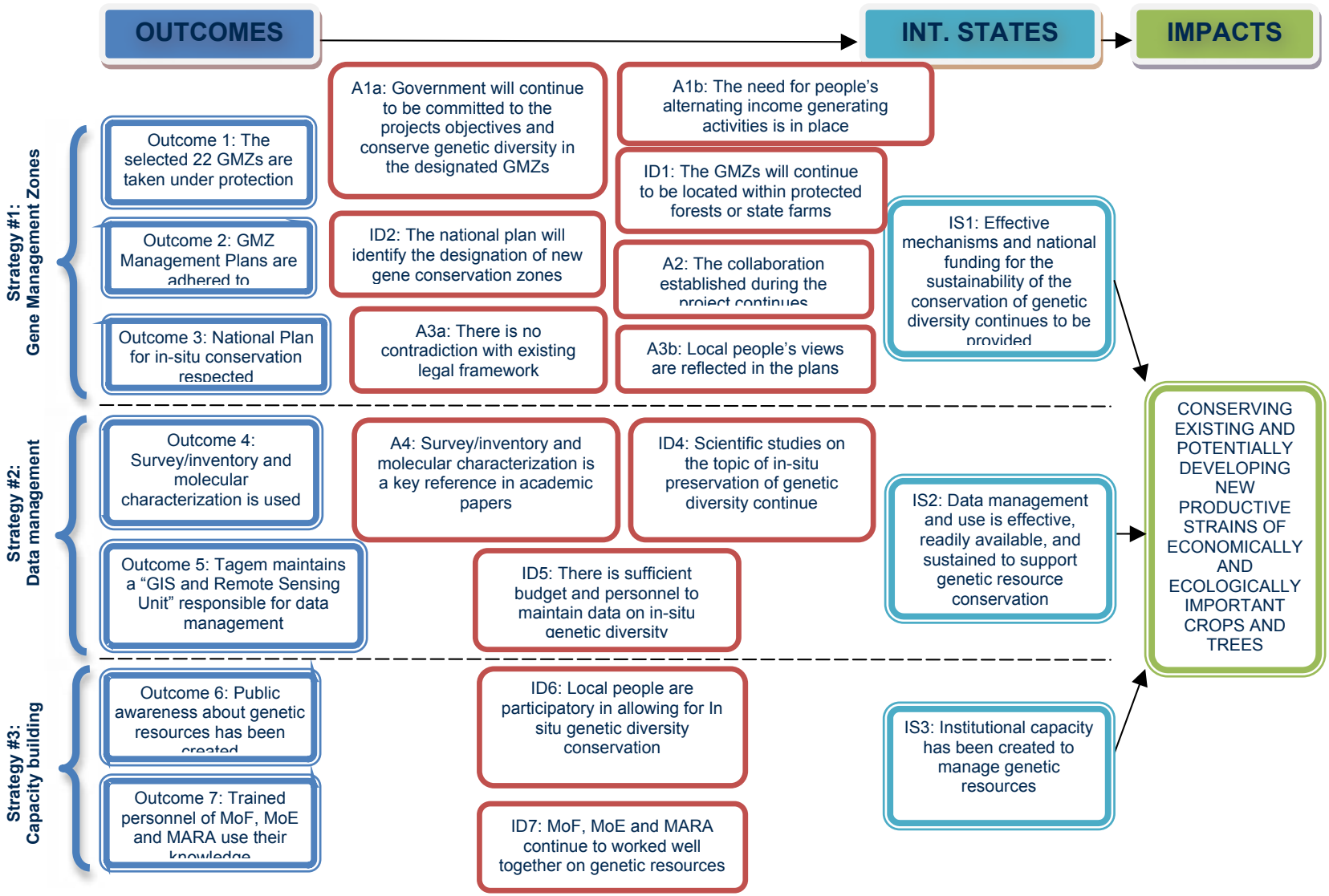


Photo 4: Ex situ cultivation of new barley species at Tagem

Annex 5: Schematic of In-Situ Conservation theory of change



TECHNICAL DOCUMENT D.

ROtI on Initial National Communication Project

1. Introduction

This review was carried out as part of the GEF Turkey country portfolio evaluation (CPE). This review aims at assessing concrete, measurable and verifiable results (outcomes and impacts) of the GEF in Turkey using an impact evaluation methodology being developed by the GEF Evaluation Office, called the Review of Outcomes to Impacts (ROtI).

The subject of this ROtI assessment is the project: Preparation of Turkey's Initial National Communication to the UNFCCC (the "INC" project), which was an enabling activity by GEF/UNDP that was implemented in the period August 2005 to October 2006. The project fell under all four Operational Programmers of the GEF Climate Change Focal Areas, namely 5 (Removal of Barriers to Energy Efficiency and Energy Conservation), 6 (Promoting the Adoption of Renewable Energy by Removing Barriers and Reducing Implementation Costs), 7 (Reducing the Long-Term Costs of Low Greenhouse Gas Emitting Energy Technologies) and 11 (Promoting Environmentally Sustainable Transport). At project appraisal the GEF endorsed a grant of US$ 405,000, with co-financing of US$ 843,050 being an in-kind contribution from the Turkish Government (UNDP, 2009b).

The stated global environmental objective of the project was to '*develop and enhance national capacities and facilitate the process of mainstreaming climate change issues into national planning and policy, thus enabling the country to deal with climate change and consider it not only as environmental but also a sustainable development issue*', which was to be achieved as part of the project's overall objective, '*to enable Turkey to prepare and submit its Initial National Communication to the COP of the UNFCCC in accordance with its commitments as an Annex 1 Party to the Convention as mandated by Article 4 and 12 of this Convention*.

The project had the following seven components (UNDP, 2005):

(a) an inventory of greenhouse gases for the year 1990-2003
(b) analysis of potential measures to abate the increase in greenhouse gas emissions in Turkey;
(c) an assessment of potential impacts of climate change in Turkey and adaptation measures;
(d) assessment of cost and benefits of various energy policy alternatives on climate change;
(e) capacity building in the areas of scientific and technical potential and institutional relations infrastructure and data network for information and data acquisition to enable the development of national communications in Turkey on a continuous basis;
(f) preparation of the INC of Turkey and submission to the COP.
(g) In addition, public awareness activities and stakeholder consultations will be cross-cutting along the overall course of this exercise.

All components were financed by GEF and co-financed in-kind by GOT. The project was executed over a period of one year, coordinated by UNDP, whereas the MoEF had the overall responsibility for project implementation.

The recent review by the UNFCCC (2009) rated the project satisfactory in the sense that the INC provides a comprehensive picture of the implementation of the Convention in Turkey. The review noted that the INC covers all sections in the INC as required by the UNFCCC reporting guidelines. However, a number of these sections were not provided in a sufficiently comprehensive manner (e.g. the total effect of policies and measures (PaMs) and projections for non-energy sectors). However, the review did not comment on the sustainability of outcomes. This report seeks to assess whether the successfully completed project has in fact contributed to achieving lasting and beneficial environmental impacts.

The ROtI assessment involved desk research and meetings with key project stakeholders in Ankara, where consultations were conducted with individuals formerly involved in the project. The team leader, Wietze Lise, took responsibility for the overall country study report and also had responsibility for the two ROtI assessments (this UNDP/GEF Initial National Communication project and World Bank/GEF In-Situ Conservation Project presented separately). Asım Açıkel and Kerem Kaçar served as the national consultants, whereas Dennis Fenton served as the international consultant providing comments on the draft report. Annexes 2 and 3 set out Wietze Lise's itinerary and list of people consulted during the Ankara visits.

Concerning methodology the evaluation team note that the evaluation of a relatively small scale project, namely an enabling activity is more difficult than a full sized project, as such projects are generally not evaluated by GEF afterwards, as was the case with this project; only recently a useful review (UNFCCC, 2009) appeared but this had a different scope. The absence of a GEF evaluation also made it more challenging to model the project into a ToC framework.

In this ROtI, the elements are first based on desk research and literature review. Consequently, each of the elements of the ToC, namely outcomes, impact drivers, assumptions, and intermediary states were discussed by bilateral interviews. A final workshop including all the key project stakeholders was held to double-check whether the gathered information through document study and interview could be supported by a group consensus.

The report is structured according to the ROtI methodology, starting with the characterization of the intended project environmental impacts, or GEBs (section 2). The logical sequence of conditions (i.e. theory of change) deemed necessary to convert outcomes to impacts was then modeled (sections 3), followed by an assessment of the extent to which the outcomes-impacts pathways have been realized, which in turn provides an indirect measure of impact that is likely to be achieved over time (section 4). Section 5 provides a summary of the overall conclusions of the ROtI assessment.

2. The project's global environmental benefits

The starting point for the ROtI assessment is to identify the project's intended environmental impacts, which for GEF projects is the delivery of global environmental benefits (GEBs), which are defined in the ROtI handbook as *'lasting improvements in the status of an aspect of the global environment that safeguards environmental functioning and integrity as well as benefiting human society'*. The GEB for the INC project was stated by UNDP (2005, page 43 and 45) "to stabilize greenhouse gas concentrations in the atmosphere at a level that would prevent dangerous anthropogenic interference with the climate system", which is globally significant in terms of combating the impact of humanly induced climate change. However, this cannot be achieved by Turkey alone and will need the cooperation of all nation states in the world. Therefore, a more practical reformulation is followed in this ROtI as follows: **cost effective greenhouse gas mitigation measures implemented in Turkey**.

The threat reduction this project has aimed at has been to make an inventory of adaptation measures to minimize the vulnerability of Turkey to climate change. The vulnerabilities identified by Turkey are (UNDP, 2009a):

(f) an increased risk of drought, with Turkey being one of the most vulnerable countries in this regard;
(g) decreased per capita water availability (concurrent with increased demand for water);
(h) an increase in the frequency and intensity of floods associated with extreme rainfall events;
(i) an increased risk of desertification, particularly in South-East Anatolia and the continental interior; and
(j) loss of biodiversity in several ecosystems where case studies were performed.

Several case studies under the first National Communication assessed other possible vulnerabilities (e.g. increased frequency of malaria or Crimean-Congo hemorrhagic fever, sea level rise), but did not reach clear conclusions.

With regards to *adapting* to climate change, Turkey has made a start on developing the targeted adaptation measures that are needed to deal with the effects of climate change. However, there is still a lot of work to be done in that direction.

But in addition to adaptation, Turkey also assessed their capacity to take greenhouse gas emission mitigation measures, which after implementation will ultimately contribute to a lower amount of global greenhouse gas emissions. Turkey continues to seek ways to reduce emissions by increasing energy efficiency and increasing the role of renewable energies. In Turkey energy efficiency is rising in priority on the policy agenda. Energy efficiency contributes to increasing energy supply security, maintaining a high level of GDP growth and overcoming environmental concerns with the main driver being climate change. Legislation on energy efficiency has recently been formulated and implemented. The next step in the process is to encourage investments in energy efficiency using market mechanisms. Moreover, three forthcoming GEF projects focus on energy efficiency. Finally, ongoing and upcoming financing facilities of the World Bank, Kreditanstalt für Wiederaufbau (KfW), EIB and EBRD, are to work in collaboration with local banks on energy efficiency and renewable energy.

Renewable energy, mainly hydro, wind, geothermal and solar, has the following potential in Turkey (WKO, 2008):[70]

[70] The technical potential of renewable energy resources is presented by Yilmaz (2006).

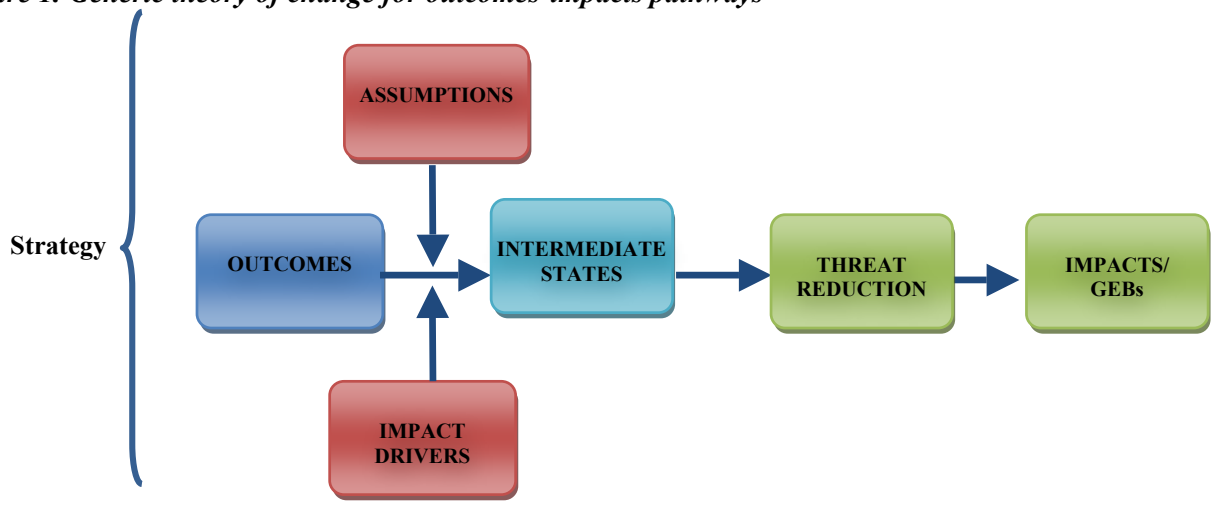
- Economically feasible hydropower has a potential of about 170 TWh/year. Currently about 36 % of this has been exploited;
- According to the Turkey Wind Atlas, there is an economic wind potential of 48 GW, and currently about 2% has been exploited;
- The economic potential for geothermal is 3 GW of electricity (3% exploited). The main benefit could come from heat supply with a potential of 30 GW.
- The economic thermal potential of solar energy is estimated 131 TWh/year by the Electrical Power Resources Survey and Development Administration (EIE), corresponding to 300 million m² collector surface. However, solar electricity generation currently costs over 3 times the above three renewable energy sources.

The next section identifies the theory of change deemed necessary to deliver the project's global environmental benefit, i.e. the improved protection and conservation of Turkey's of wild crop relatives of herbaceous and woody species.

3. The Initial National Communication outcomes-impacts theory of change

The theory of change for a project is the logical sequence of conditions and factors that are necessary to deliver the ultimate project impact. The basic project theory of change starts with activities and develops through a means-ends hierarchy until finally reaching impact. GEF project terminal evaluations assess the basic theory of change as far as outcomes, but do not usually go far in assessing the crucial last step to impact. The ROtI assessment focuses on this last step and develops and assesses a detailed theory of change between outcomes and impacts, referred to as ***outcomes-impacts pathways***. Each outcomes-impacts pathway represents a specific strategy. 3.Figure 1 below illustrates the key elements and relationships for the detailed theory of change between outcomes and impacts.

Figure 1. Generic theory of change for outcomes-impacts pathways



The key ingredients in the outcomes-impacts pathways (or strategies) that are examined by this ROtI are intermediate states, impact drivers and assumptions, which are defined in Table 1 below. If the project outcomes are assessed to be successfully delivered and the key ingredients of the theory of change between outcomes and impacts are in place, then it is reasonable to conclude that there is indirect evidence that the barriers and threats to impact have been overcome and that impact has or will be achieved with time.

Table 1. Definitions of theory of change elements in the outcomes-impacts pathways

ToC terms	Definition
Intermediate States (IS)	These are the transitional conditions between the project's outcomes and impacts that must be achieved in order to deliver the intended impacts
Impact Drivers (ID)	These are the significant factors that, if present, are expected to contribute to the ultimate realization of project impacts and that are within the ability of the project to influence
Assumptions (A)	These are the significant factors that, if present, are expected to contribute to the ultimate realization of project impacts, but that are largely beyond the power of the project to influence or address

The development of the Initial National Communication outcomes-impacts theory of change was based on reviewing project documentation and was validated in Ankara/Turkey with key informants. The resulting project outcomes-impacts theory of change is presented in Table 2 overage, and Annex 4 provides a schematic of the model.

The three strategies, which were formulated based on assessing the outcomes of the project document, are roughly in line with the project's seven components, as stated above, but have been more specifically defined to reflect what is actually required to deliver the long-term vision of the strategy in terms of achieving the intermediate state and ultimate impact. The outcomes falling under the three strategies have been re-organized and where necessary reworded from the original project brief to more clearly reflect the project's actual focus. The three intermediary states would all contribute to the threat reduction by a decreased vulnerability to climate change due to the creation of institutional capacity to assess the contribution of Turkey to climate change, leading to the ability to better inform the public about the climate change issue.

Table 2. The Initial National Communication outcomes-impacts theory of change

Project strategies	Outcome **What was the situation at the end of the project?**	Impact Driver/Assumption **What are the key factors for delivery intermediate states?**	Intermediate State **What needs to happen, to achieve impacts?**	Impact **What is the project ultimately aiming to achieve?**
STRATEGY #1: Data and Reporting	Outcome 1: Capability to make inventories of greenhouse gases created	Assumption 1: Inventory of greenhouse gases is done on a regular basis Impact Driver 1: Timely availability of good quality greenhouse gas data is a priority of the government	Intermediary State 1: The quality of greenhouse gas data and reporting meets UNFCCC reporting guidelines and assists in the decision making process	REDUCED **VULNERABILITY** IN TURKEY TO MINIMISE IMPACT OF GLOBAL WARMING  **COST EFFECTIVE GREENHOUSE GAS MITIGATION MEASURES IMPLEMENTED IN TURKEY**
	Outcome 2: Turkey's Initial National Communication (INC) prepared and agreed upon	Assumption 2: The undertaking of the National Communication is a priority of the government		
STRATEGY #2: Mitigation and Adaptation	Outcome 3: Analysis of abatement measures for **mitigation** of greenhouse gas emissions used	Impact Driver 3: Assessment capacity for greenhouse gas emissions established	Intermediary State 2: Scenarios in place that quantify economic viable greenhouse gas emission mitigation and implementation of adaptation measures	
	Outcome 4: Assessment of potential impacts of climate change in Turkey and some **adaptation** measures implemented	Impact Driver 4: Capacity created to quantify adaptation measures		
	Outcome 5: Assessment of costs and benefits of various energy policies on climate change used	Impact Driver 5: Sufficient incentives for renewable energy in place		
		Assumption 5: Policies in place to stimulate energy efficiency		
STRATEGY #3: Agenda Setting	Outcome 6: Capacity for climate change among policy makers built	Assumption 6: Professional approach towards climate change policy developed	Intermediary State 3: Climate change is part of national planning and policy agenda	
	Outcome 7: Public awareness activities and stakeholder consultations undertaken	Assumption 7: Public awareness raising activities continue		

4. Assessment of achievement of the outcomes-impacts pathways

The assessment of achievement of the outcomes-impact pathways was done based on a review of the project documentation and interviews with key informants. The assessment is presented by the three main strategies identified for achieving impact. The rating system used for the assessment is given in Table 3 below as per the ROtI Handbook, and is applied at the different levels of the Theory of Change; i.e. at the **individual ToC element level** (outcomes, impact drivers, assumptions and intermediate states) and at the **overall project level.**

Table 3. Field ROtI Rating System

Rating	Description
0	Not achieved
1	Poorly achieved
2	Partially achieved
3	Well achieved

The reporting for each strategy starts off by providing a justification for why the identified intermediate state and associated factors for the strategy are considered important in delivering ultimate impact. The theory of change for the strategy is then examined through its logical steps, firstly validating the extent to which the outcomes were achieved at project closure, followed by an assessment of the extent to which the impact drivers and assumptions have been realized. Each section concludes with an assessment of achievement of the intermediate state itself.

An overall observation is that this project was funded as a pilot enabling activity, and was implemented by MoEF with the intention that, if successful, a follow-up phase would ensue. Following the favorable review of the project, MoEF has written a proposal in 2008 to the UNDP for a follow-up enabling activity GEF project to prepare the second National Communication to the ENFCCC. This project is Council Approved, but is waiting for budget allocation. In addition three more GEF fully sized projects for UNDP on climate change have been Council Approved and are waiting for budget allocation, namely:

- Promote Energy Efficiency in Buildings;
- Market Transformation of Energy Efficient Appliances in Turkey;
- Improving Energy Efficiency in Industry.

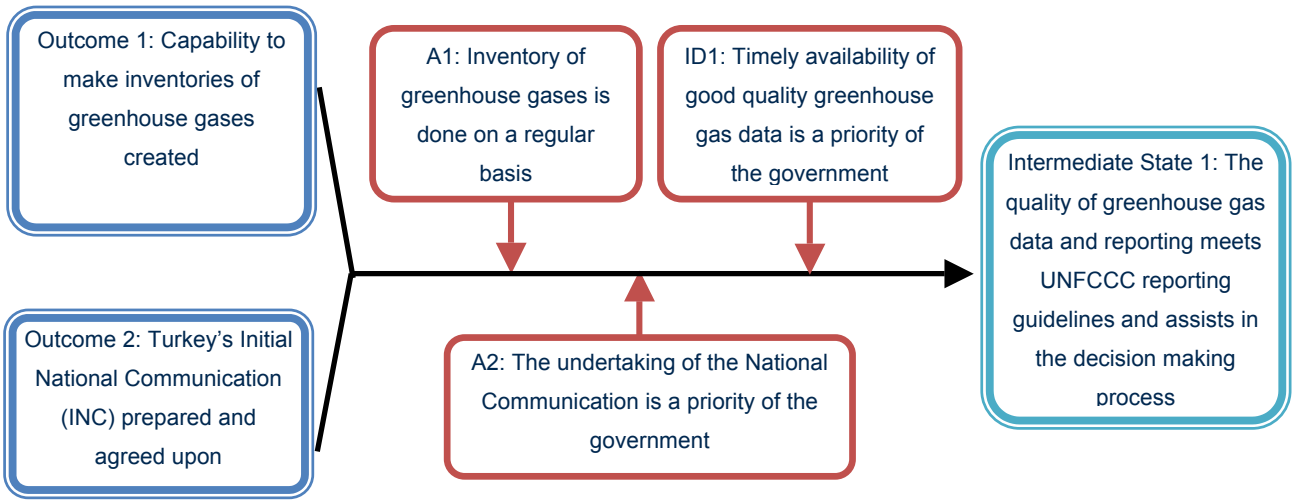
The forthcoming follow-up projects, Turkey will first of all come up with a more intricate National Communication, but also contribute to greenhouse gas emission mitigation by promoting energy efficiency and the development of renewable energy.

4.1 Strategy #1: Data and Reporting

4.1.1 Theory of change overview

The data and reporting strategy focuses on delivering the first intermediate state "*The quality of greenhouse gas data and reporting meets UNFCCC reporting guidelines and assists in the decision making process",* which was considered by the evaluation team to be an essential ingredient to directly delivering the intended project impact, i.e. to cost effective greenhouse gas mitigation measures implemented in Turkey (the GEB). The first intermediate state intends to provide the desired transparency of Turkey with the sectoral details on where they are concerning their contribution to greenhouse gas emissions.

Figure 2. Theory of Change for Strategy #1



The project outcomes that the evaluation team identified as important for delivering this intermediate state are Outcomes #1 and #2, as shown in Figure 2 above. These outcomes set out to provide a framework for gathering data and reporting. Here, Outcome #2 is the ultimate aim of the project, namely to prepare Turkey's INC, where the quality of this report depends on the quality of the inventory of greenhouse gases in Outcome #1.

Based on documentation and key informant consultations, the evaluation team identified two impact drivers and one assumption that were deemed necessary to bridge the gap between the project outcomes and the delivery of the intermediate state, as shown in Figure 2 above. The impact driver "*timely availability of good quality greenhouse gas data is a priority of the government*" is clearly a prerequisite for future reporting requirements, providing a tool for immediate feedback so that the level of greenhouse gas emissions can be monitored. The *"inventory of greenhouse gases is done on a regular basis"* is considered an assumption, because Turkey is already doing this with the latest submission with data for the period 1990–2007 on 13 April 2009. The second assumption "*the undertaking of the National Communication is a priority of the government"* is needed for creating sufficient capacity for preparing the National Communication in a timely manner. Would this not have been a priority, the reporting will not be done to quality.

Table 5 assesses the extent to which the theory of change has been realized in theory and practice, by examining the achievement of the ToC components.

Table 4. Outcomes-impacts assessment findings for Strategy #1: knowledge mechanisms and regulations

Theory of change component	Qualitative Assessment	Rating
Outcome #1: Capability to make inventories of greenhouse gases created **Outcome #2:** Turkey's Initial National Communication (INC) prepared and agreed upon	▸ Before the project there was no inventory of greenhouse gas emissions. The only available inventory was done long ago for the energy sector by TUIK. This was the first work on climate change and there is always room for improvement. Considering the budget and duration of the project, the work achieved has been very impressive. In addition, another study on emission in the agricultural sector started with an EU funded project called "Upgrading the Statistical Capacity in Turkey" implemented between 2002-2004 and this inventory will be updated in 2010. ▸ The provided inventory has some major gaps, especially concerning agriculture mainly related to most difficult issue of LUCF, but also the waste sector was problematic. A road map has been created to fill these gaps and emissions will be revised, even though UNFCCC guidelines dictate that revisions should stay within reasonable limits, even though recalculation is common. ▸ INC covers all sections as required by the UNFCCC reporting guidelines. However, a number of reporting elements were not provided (e.g. the total effect of policies and measures and projections for non-energy sectors).	2
A1: Inventory of greenhouse gases is done on a regular basis	▸ The use of common IPCC factors may give a misleading picture for the contribution of EUAS, which consists of lignite-fired power plants with varying level of calorific values. ▸ TUIK is reporting greenhouse gas emissions by sector and their news bulletin publishes the inventory every June.	3
ID1: Timely availability of good quality greenhouse gas data is a priority of the government	▸ A 7m€ EU project towards creating an environmental database has been undertaken, where Turkey would be able quantify their progress in various conventions, but this project could not be completed and failed to deliver the required outcome. ▸ Regulation and political mandate is missing to improve data quality and transparency, but also to ascertain quality control.	1
A2: The undertaking of the National Communication is a priority of the government	▸ TUBITAK has 4 ongoing medium/large scale projects on climate change, created climate change scenarios and has done preparatory work for the next National Communication also to be funded by GEF, which demonstrates the importance given by GOT. ▸ INC has involved all main government parties in a coordinated effort. ▸ SPO has added climate change policy as an item to the 9th development plan, which joins the politics of all ministries. ▸ The Turkish Science and Technology High Council enacted a regulation that prioritize and therefore increase the funding opportunities for climate change projects from national funds. ▸ The energy strategy, which is now waiting for clearance from the HPC, focuses also on industry, waste and greenhouse gas emissions.	2
Intermediate State 1: The quality of greenhouse gas data and reporting meets UNFCCC reporting guidelines and assists in the decision making process	▸ There was no foundation before the INC was undertaken, the next National Communication will be much better due to improved capacity and gained experience in the INC project.	2

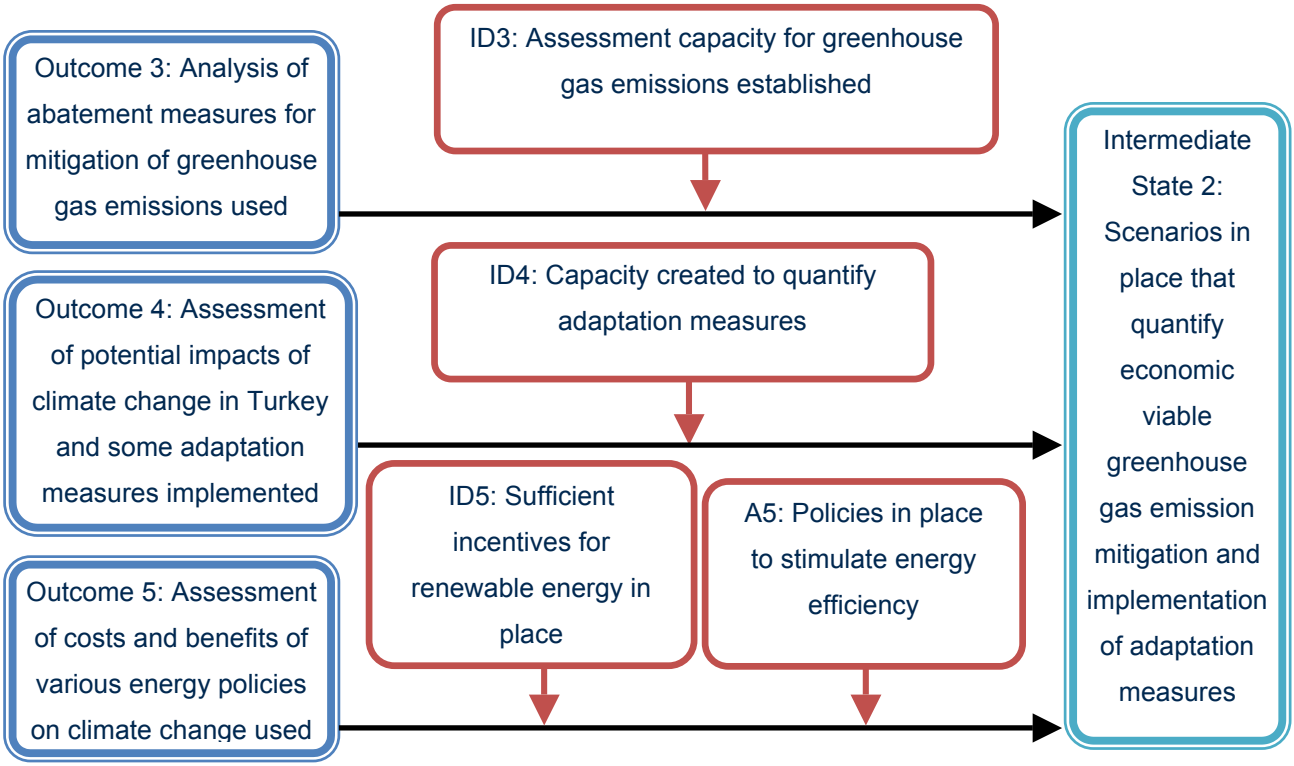
4.2 Strategy #2: Mitigation and Adaptation

4.2.1 Theory of change overview

The Mitigation and Adaptation strategy focuses on delivering the second intermediate state *"Scenarios in place that quantify economic viable greenhouse gas emission mitigation and implementation of adaptation measures"*, which was considered by the evaluation team to be the second key ingredient to directly delivering the intended project impact. After the inventory on where Turkey is concerning greenhouse gas emissions also in comparison with other countries, the second strategy points out what Turkey could reasonably do to stay below the baseline level of greenhouse gas emissions on the one hand and to develop a coping strategy in response to the expected impact of climate change in Turkey.

The project outcomes that the evaluation team identified as important for delivering this intermediate state are Outcomes #3, #4 and #5 as shown in 03 below. Outcome #3 analyzed mitigation possibilities for Turkey, Outcome #4 made a beginning on an adaptation strategy for Turkey, whereas Outcome #5 provided an analysis of cost and benefits of various climate change policies.

Figure 3. Theory of Change for Strategy #2



Based on documentation and key informant consultations, the evaluation team identified three impact drivers and one external assumption that would be needed to bridge the gap between the project outcomes and the delivery of the intermediate state, as shown in 0 above. The first impact driver is *"Assessment capacity for greenhouse gas emissions established"* This capacity is absolutely necessary if Turkey is to be able to assess and reassess mitigation options. Likewise, the second impact driver *"Capacity created to quantify adaptation measures"* is essential if Turkey is to prepare a coping strategy for the expected impacts of climate change. The third impact driver *"Sufficient incentives for renewable energy in place"* would help Turkey to develop their renewable energy potential. Even though there is a renewable energy law in place, the incentives of maximum 55 €/MWh have so far been substantially below prices at the wholesale power market. The external assumption *"Policies in place to stimulate energy efficiency"* shows that energy efficiency is given priority as a low-cost mitigation policy option.

Table 6 assesses the extent to which the theory of change has been realized by examining the achievement of the ToC components.

Table 5. Outcomes-impacts assessment findings for Strategy #2: economic viability

Theory of change component	Qualitative Assessment	Rating
Outcome #3: Analysis of abatement measures for mitigation of greenhouse gas emissions used **Outcome #4:** Assessment of potential impacts of climate change in Turkey and some adaptation measures implemented **Outcome #5:** Assessment of costs and benefits of various energy policies on climate change used	▸ Work is ongoing to rehabilitate and afforest 2.3 million ha of forests, as part of the Afforestation and Erosion Control Mobilization Action Plan 2008-2012 ▸ There is no data available on Turkey's capability to adapt to climate change, except for some case studies on health, water resources and water ecosystem assessments at *Buyuk Menderis* undertaken by the ministry of meteorological works. Further research is needed to map the difficult topic of vulnerability. ▸ The main focus in climate change policy has been on costs of reduction, which is also one of the major concerns of the private sector, whereas the possible benefits have been largely ignored.	2
ID3: Assessment capacity for greenhouse gas emissions established	▸ The ENPEP model output for the energy sector as run by METU has been used in the INC, which is an update of an earlier run for Turkey done in a World Bank project. ▸ ENPEP2 is under preparation, but there is difficulty in separating national and international consumption ▸ TINA-EU transport project also looks into emission reduction possibilities	1
ID4: Capacity created to quantify adaptation measures	▸ Adaptation project supported by the Spanish government of 7 m$ is going on. There are no impacts yet , but these will certainly be achieved in the long run	2
ID5: Sufficient incentives for renewable energy in place	▸ There is a renewable energy law since 2005, but the level of incentives with a maximum of 55 €/MWh (also approved for 2010-2011) has been substantially below the going wholesale market price of electricity, making renewable energy development project dependent on oil price driven wholesale power price projections.	1
A5: Policies in place to stimulate energy efficiency	▸ Energy Efficiency Law effectuated in 2007. ▸ Regulation on Energy Performance of Buildings is waiting for the issue of Energy Performance Calculation Methodology by MENR. ▸ Buildings >1,000 m^2 will need central heating.	2
Intermediate State #2: Scenarios in place that quantify economic viable greenhouse gas emission mitigation and implementation of adaptation measures	▸ The aim was to present 7 scenarios for greenhouse gas emission reduction, but the INC finally included only 2 scenarios, a base line and demand side management scenario for the energy sector, which represents about three quarters of greenhouse gas emissions in Turkey. ▸ There are different views on scenarios of the macro economic development in Turkey by academics and SPO. The official growth targets of the SPO became the reference scenario. In the next National Communication, alternative scenarios also need to be presented.	1

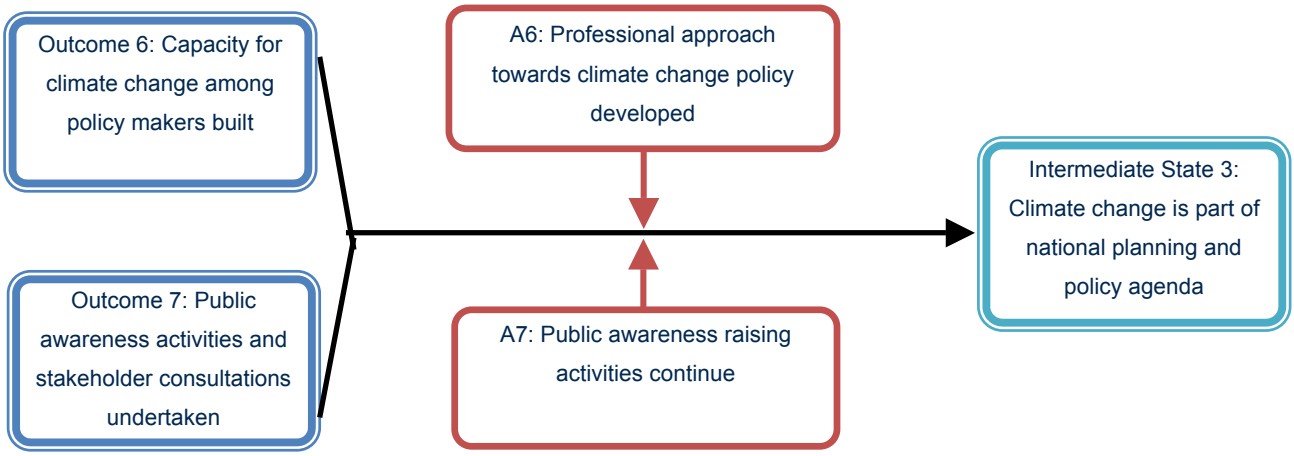
4.3 Strategy #3: Agenda Setting

4.3.1 Theory of change overview

The Agenda Setting strategy focuses on delivering the third intermediate state "*Climate change is part of national planning and policy agenda",* which was considered by the evaluation team essential to deliver the intended project impact. The strategy relates to integrating climate change into the policy making process.

The project outcomes that the evaluation team identified as important for delivering this intermediate state are Outcomes #6 and #7 as shown in 4 below. The outcomes focus on capacity building among decision markers and awareness raising on climate change.

Figure 4. Theory of Change for Strategy #3



Based on documentation and key informant consultations, the evaluation team identified two external assumptions, which are in place for bridging the gap between the project outcomes and the delivery of the intermediate state, as shown in 0 above. The first external assumption "*Professional approach towards climate change policy developed"*, in the sense that the issue of climate change is taken seriously among the important stakeholders in Turkey, is important for taking the issue of climate change seriously by Turkish decision makers. The second external assumption "*Public awareness raising activities continue"* acknowledges that a key step in mitigating greenhouse gas emissions is by seeking voluntary participation of the public.

Table 7 assesses the extent to which the theory of change has been realized by examining the achievement of the ToC components.

Table 6. Outcomes-impacts assessment findings for Strategy #3: Agenda Setting

Theory of change component	Qualitative Assessment	Rating
Outcome #6: Capacity for climate change among policy makers built **Outcome #7:** Public awareness activities and stakeholder consultations undertaken	▸ Since many stakeholders are involved and affected differently by climate change policy, a lot of persuasion and lobbying was needed to get the cooperation of all parties, but persistence by Prof Sarikaya of undersecretary of MoEF helped to convince them. ▸ Some 7,000 people participated in all the meetings that were held all over Turkey in the course of the INC project. ▸ The INC project was the first of its kind to work together with so many stakeholders, media, NGOs, academia, international organizations and a number of workshops were organized.	2
A6: Professional approach towards climate change policy developed	▸ There is a need for internal guidelines to stimulate that the built up capacity is maintained. ▸ Capacity at the ministry of transport has greatly increased due to the INC project ▸ Climate change department may be needed at MoEF, because at present this work is added to the existing workload ▸ The number of delegates increase exponentially from 2-3 in the COP of Bali to 10-20 in the COP of Copenhagen ▸ UNDP has 3 ongoing projects on climate change on adaptation, legislation changes and on improving negotiation skills.	2
A7: Public awareness raising activities continue	▸ In education climate change lessons are done for one week per year. ▸ Zero carbon events are taking place in Turkey. ▸ Commercials are broadcasted regularly to raise public awareness.	2
Intermediate State #3: Climate change is part of national planning and policy agenda	▸ This intermediary state is about to be reached. ▸ Previously there was no interest n climate change, but recently there have been many requests for climate change project possibilities. ▸ The formulation of a climate change **action plan** is currently under preparation. ▸ Turkey became a party to the UNFCCC on 24 May 2004 ▸ Turkey became a signatory party to the Kyoto protocol as of 26 August 2009. ▸ EU twinning project has opened the environmental chapter as of 21 December 2009 to align to EU environmental directives.	2

5. Overall conclusions

Overall there has been partial success in progressing towards delivering the intended global environmental benefits to cost effective greenhouse gas mitigation measures implemented in Turkey. No direct measures of the status of the global environmental benefit were attempted by the project. This ROtI assessment is based purely on the validation and assessment of the delivery of the theory of change modeled above, which has been developed through consultation with the former project stakeholders in Turkey. However, even though the progress towards threat reduction has been limited, and the progress attributable to this project small, it can be concluded that this project did a great job for the money spent.

A final consolidated rating of the project's progress towards impact is given in Table 7 below (using the scoring system given in Table 3 above). It provides an assessment of the extent to which the project's theoretical design is in line with the validated theory of change deemed necessary for delivering impact and the progress towards delivering the outcomes-impacts pathways.

Table 7. Overall rating of project impact

	OUTCOMES - IMPACTS ASSESSMENT
Strategy 1: Data and Reporting	2
Strategy 2: Mitigation and Adaptation	1
Strategy 3: Agenda Setting	2
Overall project	**2**
Rating description: a number of mechanisms were set in motion to achieve the Theory of Change after the GEF funding ended which has been providing a basis especially for national institutions to take the responsibility for following up on the project achievements.	

The project can be considered successful in delivering on its purpose. As a learning and innovation project, it has increased the capacity of Turkey in reporting to the UNFCCC and it has set in motion the development of a climate change action plan by Turkey. Progress by Strategy #1 and #3 in agenda setting, data and reporting was the most effectively implemented component of the project. This has been a good learning experience; however Turkey still needs GEF support to provide the latest national communication to UNFCCC. The second strategy was the weakest component of the project, where two scenarios were created and that only for the energy sector, namely a baseline and a reduction scenario mainly based on demand side management. The development of an adaptation strategy for Turkey will also require much more work. Most likely, the second strategy will develop much slower than the other two strategies, which will also delay achieving the stated global environmental benefit: *cost effective greenhouse gas mitigation measures implemented in Turkey*.

Annex 2: Turkey Country Study Itinerary 2009/2010

Monday 26 October
- Meeting at UNDP

Thursday 3 December
- Meeting at UNDP

Monday 28 December
- Meetings at MoEF

Tuesday 29 December
- Meeting at UNDP

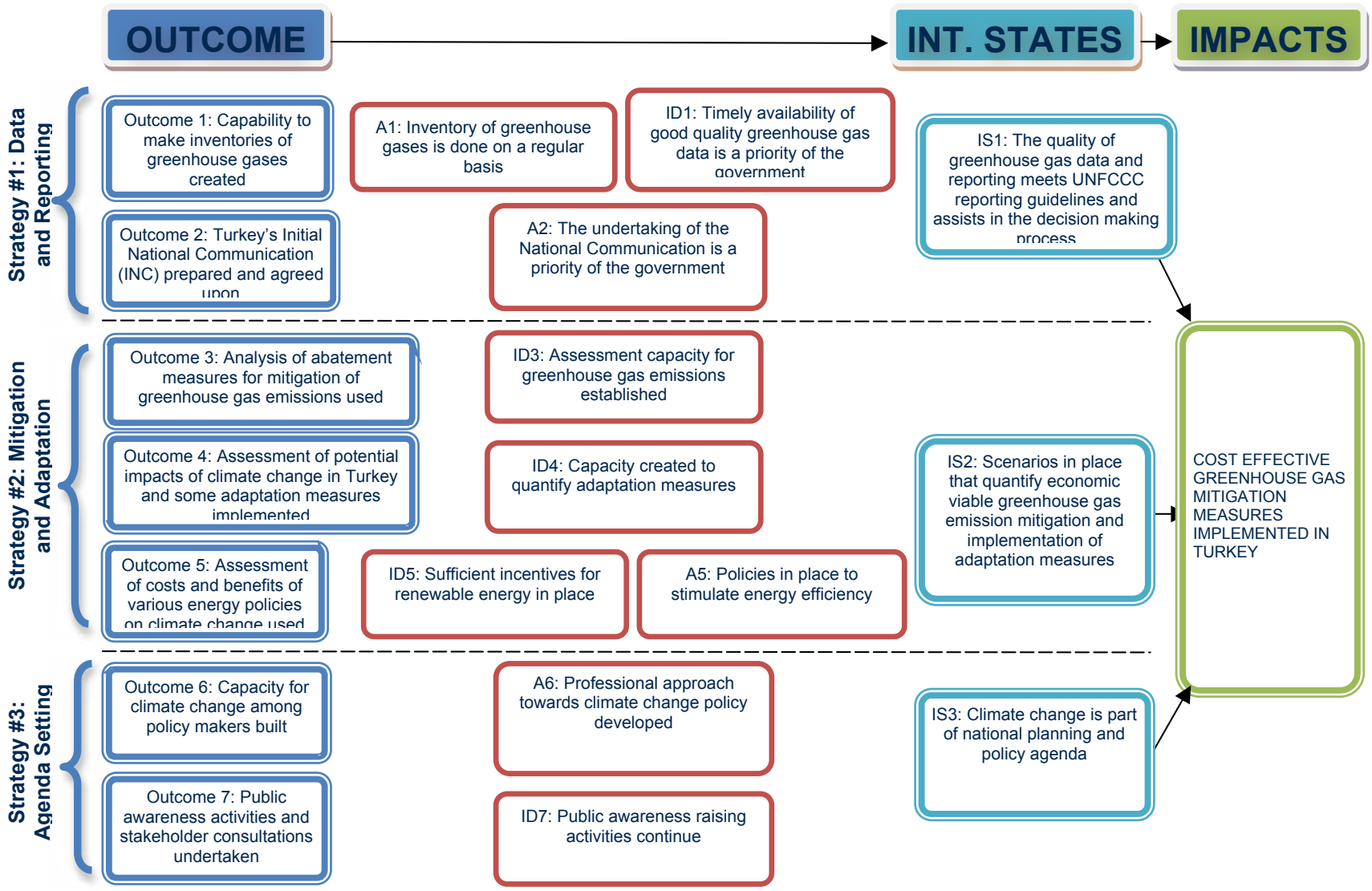
Wednesday 30 December
- Meeting at MoEF

Friday 15 January
- ROtI workshop at MoEF, with participation of MoEF, TOBB, EUAS, MENR, UNDP, General Directorate of State Meteorology, Ministry of Transport and TUIK.

Annex 3: People met

Date	People	Position, organization	
26/10/2009	Katalin ZAIM	Programme Manager	UNDP Turkey
	Bercan Toros	Programme Assistant	
3/12/2009	Katalin ZAIM	Programme Manager	UNDP Turkey
28/12/2009	Sedat KADIOĞLU	Deputy Undersecretary	MoEF
28/12/2009	Mustafa ŞAHİN	Department Head	MoEF, Focal Point of UNFCC
29/12/2009	Bahar UBAY	Project Manager	UNDP Turkey
30/12/2009	Fevzi İŞBILIR	General Director	General Directorate of Environmental Impact Assessment, MoEF
15/1/2010	Ayşegül EMİRALİOĞLU	Assistant expert	MoEF, Foreign relations department
	Ahmet SENYAZ	Department Head	MoEF, R&D
	U. Tamer ÇOBANOĞLU	Assistant expert	MoEF, education and publication department
	İlke TANLAY	Assistant expert	TOBB
	Ayşegül KARAYAZGAN	Manager	EUAS
	Mustafa KAYA	Division Manager	MENR, general directorate of energy issues
	Cengiz CELEBİ	Division Assistant Manager	
	Birgül YİĞİT	Engineer	
	Elif Nesibe KOÇER	Engineer	
	Gülseren ÇAĞLAR	Engineer	MoEF, R&D
	Hakan TAŞHAN	Engineer	Turkish Development Bank,
	Bahar UBAY	Project Manager	UNDP Turkey
	Gönül KILIÇ	Engineer	General Directorate of State Meteorology
	Afife Ülkü KOÇER	Chief environmental engineer	Ministry of Transport
	Kader TUĞAN	Environmental Engineer	MoEF, Weather Management Department
	Ali CAN	Team member	TUIK, emission inventory
	Dr.Mustafa ŞAHİN	Department Head	MoEF
	Evren TÜRKMENOĞLU	Expert manager	

Annex 4: Schematic of the Initial National Communication theory of change



TECHNICAL DOCUMENT E.

Electronic Survey

An electronic survey was conducted following a suggestion from stakeholders participating at the 1st consultation workshop in October 2009. This e-survey does not aim to be statistically representative, but it proved to be extremely helpful as a qualitative source of information for triangulation analysis. 475 people were contacted by email, and two reminders were sent. 90 valid responses were received, implying a response rate of 19%. Due to a glitch in the translation of the questionnaire from English to Turkish in the categorization of respondents, the distinction between national and local government was lost.

The survey questionnaire is presented in its original form, divided by sections. Responses to each question are given in absolute numbers.

SECTION I: Respondent categorization

1. In which of the following categories you primarily identify yourself for this survey?	
a National Government	48
b Local Government	0
c NGO/CBO	11
d Academia/Research	18
e Private sector	2
f GEF Agency	3
g Other Donor/International Organization	8
e Other (specify)	0

2 What has been your involvement with GEF activities?	
a Aware of GEF activities in Turkey, but never consulted or involved in GEF activities	21
b Consulted during project preparation, implementation and/or evaluation	9
c Directly involved in GEF project preparation and/or implementation, or other GEF activities	59
d Other (specify)	1

SECTION II: Relevance of the GEF

Relevance: the extent to which the objectives of the GEF activity or project are consistent with beneficiaries' requirements, country needs, global priorities and partners' and donors' policies, including changes over time

	Statement/Question	Strongly Agree	Agree	Disagree	Strongly Disagree	I don't know
a	GEF support is relevant to Turkey's environmental policies that are currently being redesigned in the context of the ongoing EU accession process	15	42	8	1	5
b	GEF projects support Turkish sustainable development needs (i.e. income generation, capacity building, etc.) and challenges, including support to gender development	13	43	9	3	2
c	GEF projects include trade-offs between global environmental concerns and Turkish sustainable development priorities	12	41	10	1	2
d	GEF support is relevant to Turkish focal area strategies and action plans such as the National Biosafety Framework, the National Biodiversity Strategy and Action Plan, etc.	8	41	10	0	10
e	Government planning agencies have a clear role to play in project identification, selection, development, monitoring and evaluation of GEF projects	7	31	22	2	6
f	GEF projects support Turkey in meeting its commitments to the global environmental Conventions and achieve global environmental benefits in biodiversity, climate change, international waters, land degradation and POPs	16	43	6	1	3
g	GEF support in Turkey is relevant for addressing all GEF Focal Areas which are important for Turkey, including biodiversity, climate change, international waters, land degradation and POPs	13	38	11	0	7
e	GEF support in Turkey GEF has country ownership and is country-driven (throughout the project cycle)	14	36	16	0	3
f	GEF projects support innovation by providing know-how and piloting/demonstrating new technologies in relevant fields	11	36	15	0	8

g	Is there anything you would like to add with respect to the relevance of the GEF in Turkey? Do you wish to explain your answers? If so, please do so in the space provided below:

SECTION III: Efficiency of the GEF

Efficiency: The extent to which results have been delivered with the least costly resources possible (funds, expertise, time, etc.)

	Statement/Question	Strongly Agree	Agree	Disagree	Strongly Disagree	I don't know
a	The GEF funding mechanism is easy to access	3	16	25	4	18
b	GEF project identification and selection processes are participatory and efficient	4	29	17	2	12
c	The processing time and costs (according to the GEF project cycle) from the preparation of the project concept to approval and implementation is comparable with those of other grant-making organizations in Turkey	3	33	6	2	22
d	GEF funds in Turkey are considered to have a large impact in relation to the level of funding, and are cost-effective in producing results	2	22	21	3	16
e	Implementing Agencies and National Authorities monitor and evaluate GEF projects	3	38	9	4	11
f	GEF Project/portfolio monitoring in Turkey feeds into project planning and implementation decision-making	7	35	13	2	7
g	Turkish Government and/or GEF agencies and/or other implementing partners act on information provided in GEF monitoring and evaluation reports	2	25	18	4	16
h	Turkish Government's own approach to monitoring and evaluation is revised/improved based on lessons learnt with GEF activities	4	21	23	4	12
i	Participation of all stakeholders in GEF activities, including the private sector and civil society organizations, is adequate in Turkey	1	19	32	7	6
j	Roles and responsibilities of the various GEF actors in Turkey are clear	1	24	19	7	12
k	GEF-supported national projects are fully complementary to and coordinate well with other projects active in their location	6	25	14	4	16
l	GEF support has helped public and private partners work together	4	37	13	2	8
m	Effective communication and technical support and information sharing exists between GEF partners in Turkey, including agencies, government and civil society, and local communities	5	21	25	3	10
n	Synergies exist between GEF and other donors in Turkey	1	23	18	3	16

o	Is there anything you would like to add with respect to the efficiency of the GEF in Turkey? Do you wish to explain your answers? If so, please do so in the space provided below:

SECTION IV: Effectiveness and Results of the GEF

Effectiveness: the extent to which the GEF activity's objectives were achieved, or are expected to be achieved, taking into account their relative importance. **Results**: the output, outcome or impact of a GEF activity. *Outputs* are the goods and services resulting from a GEF activity; *outcomes* are the likely or achieved short-term and medium-term effects of a GEF activity; *impacts* are the positive and negative, intended or unintended long-term effects to which a GEF activity has directly or indirectly contributed.

	Statement/Question	Strongly Agree	Agree	Disagree	Strongly Disagree	I don't know
a	GEF support has contributed to achieve results in Biodiversity Conservation	5	35	9	0	15
b	GEF support has contributed to achieve results in Climate Change	4	32	14	2	11
c	GEF support has contributed to achieve results in International Waters	1	14	11	5	30
d	GEF support has contributed to achieve results in Land Degradation	1	16	12	3	30
e	GEF support has contributed to achieve results in Persistent Organic Pollutants	1	12	14	2	34
f	GEF support has contributed to strengthening public and private institutions in Turkey	8	32	10	4	8
g	GEF support has contributed to capacity development and awareness raising about environment issues in Turkey	13	37	8	0	5
h	GEF has successfully involved civil society in its projects	9	29	12	3	9
i	GEF has contributed to improving gender balance in its intervention areas	0	21	16	1	22
j	Project design and implementation have incorporated lessons from previous projects within and outside GEF operations	2	23	12	1	23
k	GEF projects have been able to promote effective local level Natural Resource Management in Turkey's national parks, and has been successful in obtaining the active participation of local communities	4	24	13	1	21
l	GEF projects have contributed to secure sustainable financing of Turkish protected areas systems at the national level	2	23	12	2	23
m	GEF projects have contributed to national and regional commitments, strategies and institutions to address shared water resource concerns which are important for Turkey	1	17	9	4	32
n	GEF projects have contributed to the development of policies and legal instruments to address shared water resource concerns which are important for Turkey	0	16	10	5	30
o	GEF support produced results which are sustained over time and continue after project completion	5	27	15	2	13
p	Financial and economic resources exist to replicate and/or follow-up GEF-supported activities after completion, through the Turkish Government or external donors' funded projects and programmers	3	21	15	3	18
q	Stakeholders' ownership, technical know how and an institutional and legal framework exists for replication and/or follow-up GEF-supported activities after completion	1	22	18	3	18

r	Is there anything you would like to add with respect to the effectiveness and results achieved by the GEF in Turkey? Do you wish to explain your answers? If so, please do so in the space provided below

GEF Evaluation Office Publications

Number	Title	Year
Evaluation Reports		
59	GEF Country Portfolio Evaluation: Moldova (1994–2009)	2010
58	GEF Annual Country Portfolio Evaluation Report 2010	2010
57	GEF Annual Performance Report 2009	2010
56	GEF Impact Evaluation of the Phaseout of Ozone-Depleting Substances in Countries with Economies in Transition, Volumes 1 and 2	2010
55	GEF Annual Impact Report 2009	2010
54	OPS4: Progress Toward Impact—Fourth Overall Performance Study of the GEF, Full Report	2010
53	OPS4: Progress Toward Impact—Fourth Overall Performance Study of the GEF, Executive Version	2010
52	GEF Country Portfolio Evaluation: Syria (1994–2008)	2009
51	GEF Country Portfolio Evaluation: Egypt (1991–2008)	2009
50	GEF Annual Country Portfolio Evaluation Report 2009	2009
49	GEF Annual Performance Report 2008	2009
48	GEF Annual Impact Report 2008	2009
47	Midterm Review of the Resource Allocation Framework	2009
46	GEF Annual Report on Impact 2007	2009
45	GEF Country Portfolio Evaluation: Cameroon (1992–2007)	2009
44	GEF Annual Country Portfolio Evaluation Report 2008	2008
43	GEF Country Portfolio Evaluation: South Africa (1994–2007)	2008
42	GEF Country Portfolio Evaluation: Madagascar (1994–2007)	2008
41	GEF Country Portfolio Evaluation: Benin (1991–2007)	2008
40	GEF Annual Performance Report 2007	2008
39	Joint Evaluation of the GEF Small Grants Programme	2008
38	GEF Annual Performance Report 2006	2008
37	GEF Country Portfolio Evaluation: Samoa (1992–2007)	2008
36	GEF Country Portfolio Evaluation: The Philippines (1992–2007)	2008
35	Evaluation of the Experience of Executing Agencies under Expanded Opportunities in the GEF	2007
34	Evaluation of Incremental Cost Assessment	2007
33	Joint Evaluation of the GEF Activity Cycle and Modalities	2007
32	GEF Country Portfolio Evaluation: Costa Rica (1992–2005)	2007
31	GEF Annual Performance Report 2005	2006
30	The Role of Local Benefits in Global Environmental Programs	2006
29	GEF Annual Performance Report 2004	2005
28	Evaluation of GEF Support for Biosafety	2006
	Third Overall Performance Study	2005
	GEF Integrated Ecosystem Management Program Study	2005
	Biodiversity Program Study	2004
	Climate Change Program Study	2004
	International Waters Program Study	2004
Evaluation Documents		
ED-4	The GEF Monitoring and Evaluation Policy 2010	
ED-3	Guidelines for GEF Agencies in Conducting Terminal Evaluations	2008
ED-2	GEF Evaluation Office Ethical Guidelines	2008
ED-1	The GEF Evaluation and Monitoring Policy	2006

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