

# TURKEY

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## Background

Turkey ratified UNFCCC in 2004, and established a National Coordination Board on Climate Change (NCBCC) by Circular No. 25377 of the Prime Ministry in the same year. An inter-ministerial coordination board on climate change had been initially established in 2001, but it was revised by the Circular of the Prime Ministry in 2004 to become NCBCC. The board has overall responsibility for climate change policies. According to working procedures of the board, 8 Working Groups (WG) were initially established to carry out research into the effects of climate change (WG1), emission inventory of GHGs (WG2), mitigation of GHGs from industry, building and the waste sector (WG3), mitigation of GHGs from the energy sector (WG4), from the transport sector (WG5), from the LULUCF sector (WG6), development of policies and strategies (WG7), and education and public awareness (WG8). The number of WGs was increased to 10 by adding adaptation (WG9) and finance (WG10) in 2008. Responsibility for the last three sectors, together with general coordination of the board, were assigned to the Ministry of Environment and Forest (MoEF).

MoEF is the National Focal Point for climate change and is the coordinating governmental body for all issues related to climate change in Turkey. At the same time, MoEF is the focal point for the European Environmental Agency and is going to establish a link to the European Environmental Information and Observation Network for fulfilment of reporting requirements.

Within MoEF, there are departments related to sectoral emissions control and environmental impact assessment. Harmonizing the existing environmental legislation with the EU *acquis* lies within the responsibilities of MoEF. The Ministry is primarily responsible for forestry activities across the country. Thus, WG6 is the most effective body in the MoEF. Missions of the LULUCF WG are:

- Determination of land use status and its integration into a GIS.
- Determination of sinks and emissions in order to estimate net CO<sub>2</sub> flux
- Development of some suggestions for formulating legal regulations and creating intensive mechanisms in order to reduce GHGs by considering economic and social circumstances.
- Initiate some work in order to reduce GHG effects generated by agriculture and livestock activities.

Turkey collaborated with UNDP in 2005 to produce the First National Communication (FNC) with a GHG inventory under a project titled “*Enabling Activities for the Preparation of Turkey’s Initial National Communication to the UNFCCC*”. Annual stock changes of carbon in the forests of Turkey, and other GHG releases in the period 1990–2004 were estimated through a subproject. The IPCC manual “*Good Practice Guidance for Land Use, Land Use Change and Forests*” (GPG-LULUCF) was used in the estimation of carbon stock changes and the inventory of other GHGs. The first communication was reviewed by UNFCCC experts (FCCC/ARR/2006/TUR). All the queries were answered in the revision. The second, third and fourth communications for 2005, 2006 and 2007 were submitted and controlled by the independent UNFCCC experts.

Turkey provided a complete time series only for carbon stock changes, excluding soils and litter, in the categories forest land, remaining forest land and land converted to forest land, and for non-CO<sub>2</sub> emissions from biomass burning under forest land. Because of the absence of adequate data for carbon in organic forest soils, and for the litter amount in varying forest types by climate regions, these two carbon pools could not be taken into account in calculations. Some coefficients used as converting factors are also need refinement and improvement. Area changes among land use forms are not based on GIS due to lack of suitable data sources.

As a member of OECD, Turkey was included among the countries of the Convention's Annexes I and II when UNFCCC was adopted in 1992. Turkey was later removed from Annex II of the Convention (Decision 26/CP.7) at COP 7 in Marrakech, 2001. Thus, Turkey remains an Annex I Party to UNFCCC, but with an anomalous status compared with other Annex I countries. Turkey was not a Party to UNFCCC when the Kyoto Protocol was adopted. Therefore Turkey does not appear in Annex-B of the Protocol, which lists the individual targets for Annex I Parties, and had no quantified emission limitation or reduction commitments within the first commitment period of the Protocol. Although Turkey had no obligation to commit a mitigation target to UNFCCC, since 2007 it has been taking an active part in negotiations on further commitments under the Kyoto Protocol and UNFCCC. All national communications submitted before 2009, and the communications to be presented until 2012, should be considered voluntary communications with no responsibility, due to this late admission. Nevertheless, it is expected to contribute to climate change mitigation, including through the LULUCF sector, post 2012. Thus, Turkey has to develop a sound strategy for mitigation. Sustainable management of forests, forestation, reforestation and forest restoration are important mitigation options in this context.

As an implementing agency, UNDP provides support to the NCBC by developing the capacities of Turkey to participate efficiently in international climate change negotiations and to join the flexible mechanisms of the Kyoto Protocol through better experience of the voluntary carbon markets.

GEF, UNEP and UNDP have provided support to certain developing country projects that have global environmental benefits, not only in the area of climate change but also in biodiversity conservation and in. Since Turkey has signed the conventions on climate change, on biodiversity and on combating desertification, sometimes called the Rio Trio, all of the documents concerning these three conventions should be considered in an integrated system for a responsible policy.

## Summary of climate change dimensions

### Data sources concerning the forests

There are only two reports concerning national forest inventory results in Turkey. The first shows the 1972 situation, while the second has data for 2004. The changes and plus/minus differences among the forest forms and tree species between 1972 and 2004 are outlined in Table 1. Detailed documentation related to the changes on forest resources is given in the bibliography.

**Table 1. The changes in forest resources between 1972 and 2004.**

	Area (ha)	Differences in	
		Growing stock (without bark m <sup>3</sup> )	Current annual increment (without bark m <sup>3</sup> )
Coniferous high forest	2 023 164	269 997 710	6 642 068
Broadleaved high forest	740 151	99 980 697	2 474 961
Total high forest	2 763 316	369 978 407	9 117 029
Coppice	-998 552	-23 782 554	-1 182 668
<b>Total Forest</b>	<b>1 764 764</b>	<b>346 195 853</b>	<b>7 934 361</b>
Degraded forest (Other Wooded Lands) <sup>1</sup>	1 741 672	11 077 894	174342
Degraded Coppice ((Other Wooded Lands) <sup>1</sup>	-2 516 985	-13 967 258	-247045
Total degraded forest	-775 313	-2 889 364	-72703
<b>Grand Total ( Forestland + Other Wooded Land)</b>	<b>989 450</b>	<b>343 175 168</b>	<b>7 861 658</b>

<sup>1</sup>Degraded forests cover the areas having <10% crown closure, termed Other Wooded Lands in FAO documents. These areas are accepted as forestland under Turkish Forestry Legislation. SOURCE: GDF 2007

From Table 1, it is evident that:

- The total area, growing stock and volume increments of the coppice forests reduced while high forests were increasing. Most decrease occurred in degraded coppices.
- The total growing stocks and annual volume increment of the coniferous and deciduous tree species increased. More than 80% of the increase occurred in coniferous tree species.
- The total increase in area is 989 450 ha; growing stock and volume increments are 343 175 168 m<sup>3</sup> and 7 861 658 m<sup>3</sup>, respectively.
- Reduction in the areas of deciduous tree species, total growing stock and current annual increment accrued because of conversion of coppice into high forest, and leaving of tree cuttings on some older managed forests for nature protection.
- According to the results of these two inventories, forest area increased by 5%, and the growing stock volume by 35%. Annual volume increment (29%) was high during the 32-year period between 1972 and 2004.

Probable reasons for these changes include:

- Rural-urban migration.
- Less traditional goat husbandry and cattle grazing in the forests and meadows adjacent to forests.
- Abandonment of some forest lands on steep slopes, with uneconomic management conditions.
- Changing attitudes in forestry, moving towards multi-functional use of forest resources in the framework of sustainable forestry management (SFM) concepts.
- Conversion of coppices into high forests.
- Afforestation activities on bare lands and degraded forests areas accomplished by the Forestry Service.

### **National research climate change in Turkey**

The findings of the Fourth Assessment Report of the IPCC underlined the need for immediate action to reduce the amount of anthropogenic GHGs emitted to the atmosphere, in order to mitigate its effects. The report also noted that a portfolio of alternatives offering enough flexibility to accommodate different national circumstances and interests will be required to achieve this goal. The importance of the global participation of developing countries is also emphasized in the report, particularly to improve their competence in the international mitigation effort post-2012.

Turkey has significant GHG emissions reduction potential. At the same time, climate change has the highest priority in the environmental agenda of the EU. As a candidate country for full EU membership, Turkey is striving to conform to EU climate change policy. Thus, to formulate a country position in post-Kyoto negotiations is a priority task for Turkey.

### **Work accomplished related to LULUCF and REDD**

Turkey had submitted four national communications by 2009. Second-level communication (Tier 2) methods given in the manual (GPG-LULUCF) were applied during the preparation of the national communications. Since countries are encouraged to use their own figures, some of the coefficients, such as biomass expansion factors (BEF<sub>1</sub>, BEF<sub>2</sub>) and Oven-dry mass (D), were derived by a national expert group using existing documentation on forest resources, forestry applications, biomass studies, and other relevant topics. Some other necessary coefficients, like root-to-shoot ratios (R) and combustion factors, were taken from the Annex tables in the manual. Gross and net carbon stock changes between 1990 and 2007 are given in Table 2.

**Table 2. Gross and net carbon stock changes in the forests of Turkey between 1990 and 2007.**

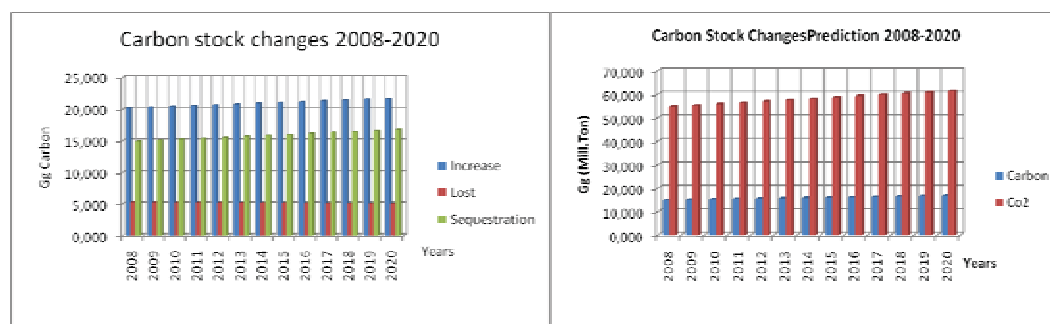
Year	Gross carbon increase Gg (million tonne)/year	Carbon lost Gg (million tonne)/year	Net carbon sequestration Gg (million tonne)/year
1990	17 984	5 871	12 113
1991	18 075	5 675	12 400
1992	18 194	5 687	12 507
1993	18 323	5 737	12 587
1994	18 325	5 332	12 992
1995	18 585	5 722	12 864
1996	18 714	5 784	12 930
1997	18 765	5 348	13 417
1998	18 863	5 202	13 661
1999	18 979	5 126	13 853
2000	19 112	5 300	13 812
2001	19 200	4 937	14 263
2002	19 405	5 284	14 121
2003	19 517	5 161	14 356
2004	19 712	5 429	14 284
2005	19 410	5 429	13 981
2006	20 126	5 500	14 626
2007	20 314	5 773	14 541

Source: National Inventory Report of Turkey (GDF, 2007).

REDD and REDD+ mechanisms for reducing emissions from deforestation and forest degradation are key mitigation options identified for developing countries. As an Annex I party, Turkey would not stand to benefit from the REDD and REDD+ mechanisms. There is a regular increasing trend in both forestland and growing stock. Although there is limited deforestation and biomass loss around large cities due to rural-urban migration, total forestlands have expanded (5% in 35 years), and total biomass has been increasing (35% in 35 years) annually in the country. SFM with 6 criteria and 28 indicators has been applied in forest management planning under the name of “Ecosystem-Based Functional Planning” since 2005.

### Expected stock changes in the future

Carbon stock changes in the future are estimated by means of trend analyses. Data given in Table 2 was used to predict gross increases, carbon lost, and net sequestration. Carbon stock changes and CO<sub>2</sub> equivalents of net carbon sequestration between 2008 and 2020 are shown in Figure 1. As can be seen from the graphs, there is an increasing trend in gross and net carbon stocks with a decreasing trend in carbon lost, for the reasons discussed earlier.



**Figure 1. Estimated net carbon stock changes and its CO<sub>2</sub> equivalent to 2020**

Rural-urban migration, in particular from villages in the forests, is increasingly annually. The ongoing actions on adaptation of a functional planning approach based on a forest ecosystem mentality, converting coppices into high forests, rehabilitation of forests with poor plant density, and afforestation and reforestation activities on bare lands and degraded forests, the new system to combat forest fires, and ICP Forest Level I and Level II plots installed for observation of forest health and damage are very important and preferable policies applied by the Forestry Service during the last decade. Observation and data collection activities from 721 Level I and 15 Level II plots for 2008 are currently being analysed ([www.icp-forests.org/](http://www.icp-forests.org/)).

From the results of forest inventory, half of the forestlands are non-productive and degraded forest stands (8.43 m<sup>3</sup>/ha growing stock and 0.23 m<sup>3</sup>/ha volume increment on average). At the same time, one-third of the productive forests have low density (0.11–0.40 crown closure) and are very old. Turkey prepared an action plan to convert degraded forestlands into productive forests by means of forestation, reforestation and rehabilitation activities.

There is no doubt that this large extent of degraded forests should be seen as having a huge potential for carbon sequestration. Turkey has a great opportunity to promote affirmative effect on climate change by accruing carbon stocks in the forests.

## **Status of assessment and research on climate change**

### **Reports**

There are two main works related to assessment of climate change in Turkey:

- Grand National Assembly Investigation Commission Report on “The Effect of Global Warming and Sustainable Management of Water Sources” (2007).
- MoEF’s Report “Climate Change and the Studies” (2008).

The first report was prepared by a special commission on behalf of the Grand National Assembly of Turkey. Dimensions and impacts of climate change, mitigation and adaptation policies to prevent its negative effects, and sustainability of water sources were elaborated in detail in this document. Subsequently, all studies related to climate change in Turkey were compiled in the second report, prepared by MoEF. Many aspects of the issue were clarified in detail in the report, such as observed and expected changes in the climate; comparison of GHG emissions in Turkey with some other countries; mitigation actions for reduction of GHGs in various sectors, like energy, transportation, industry and so on; forestation and reforestation activities; research and development; training and awareness; and capacity building. In addition, there are the four national GHG inventory reports submitted to UNFCCC ([www.ogm.gov.tr/iklim/index.htm](http://www.ogm.gov.tr/iklim/index.htm)).

### **Studies and works**

A Web site ([www.ogm.gov.tr/iklim](http://www.ogm.gov.tr/iklim)) was constructed. All kinds of studies and the reports on climate change were shared with the relevant parties. The following studies have been realized by the General Directorate of Forest (GDF) and its Climate Change Working Group ([www.ogm.gov.tr/iklim/index.htm](http://www.ogm.gov.tr/iklim/index.htm)):

- The National Afforestation Action Plan between the years 2008–2012 was prepared by GDF. 2 300 000 ha of non-productive degraded forest will be converted to productive forestlands by means of rehabilitation and reforestation actions.
- A technical report on energy production from woody biomass was prepared by a special commission.
- The GPG-LULUCF manual was translated into Turkish.
- A booklet on “Strategic Framework for Forests and Climate Change” was translated into Turkish.

- Turkey presented its FRA-2010 Report based on the guidelines set out in FAO Working Paper 143.
- Criteria and Indicators for Sustainable Forest Management Report for 2006.

### **Finished and continuing projects related to climate change and mitigation actions, supported by FAO and GEF**

#### **FAO Projects**

- Enhancing the Capacity of Turkey to Adapt to Climate Change.
- Capacity Building for Climate Change Management in Turkey.
- Developing Turkey's National Climate Change Action Plan Project.

#### **GEF Projects related to forestry and climate change**

- Enhancing coverage and management effectiveness of the subsystem of forest protected areas in Turkey's national system of protected areas (Kure Mountains).
- Capacity building for monitoring GHG emissions in the LULUCF sector (MoEF and UNDP, in preparation).
- Capacity Building in Sustainable Forest Management Planning and Forest Fire Management in Syria. This is a cooperative project supported by FAO-Turkey Partnership Programme (FTPP).

### **Proposed areas for cooperation**

Possibilities and options for collaboration between FAO and national institutions and specialists on climate change mitigation and adaptation in the forestry sector in Turkey include:

- Turkey is in a weak position in the process of negotiation actions ongoing under UNFCCC because of lack of experience and knowledge. Turkey should be encouraged to participate in negotiation actions by means of training courses on various issues of mitigation actions. Organizing of the necessary courses for supporting capacity building for government representatives in international climate change negotiations could be a collaboration possibility for FAO.
- Organization of a number of awareness raising activities for efficient participation in the VCM for various target groups through workshops, training sessions, promotional materials and sharing of experience.
- The SFM concept is gaining importance in negotiations on reducing emissions from deforestation and forest degradations (REDD/REDD+). It has also been accepted as an important concept in regional and international forest processes and a basis for timber certification in developed countries. Certification of forest enterprises or forest products processing industries is the main issue in Turkish forestry. There is no independent institution in the country authorized to certify either forest enterprises or the forest products processing industry in the country. Such activities are the concern of NGOs or other independent entities in the developed countries. Establishing a certification agency in order to fill this gap seems a useful and fruitful collaboration area for FAO and NGOs such as The Chambers of Forest Engineers, The Assembly of Turkish Foresters, and The Turkish Foundation for Combating Erosion and Desertification (TEMA).
- Definition of the criteria and indicators of SFM on a regional basis in a country is another aspect of certified SFM actions that should be considered during the negotiation of GHG emission reduction among the developed countries, as well as sound and reliable communications obtained through MRV reporting. Turkey has been applying SFM with 6 criteria and 28 indicators in its forest management planning under the name of "Ecosystem-Based Functional Planning" since 2005. The criteria and indicators of SFM were determined by GDF for the whole country, but limited to its own responsibility. Although,

one of the six criteria is to protect and enhance the carbon balance in forestlands for pan-European countries, it is not sufficiently stressed in the Turkish SFM criteria. A PhD study has looked at the issue and 8 criteria with 69 indicators were defined, but definition of the criteria and indicators of the SFM on a regional basis are still on the agenda of Turkey. Revision of existing statements supporting a few regional projects aiming to define these criteria could be another opportunity for cooperation with FAO. Organization of the varying stakeholders or target groups for efficient participation in these projects seems to be a good objective for the collaboration.

- Turkey had submitted four national communication reports by 2008. GPG-LULUCF was used on Tier 2 level in the estimation of carbon stock changes and other GHG inventories. Because of the absence of adequate data for carbon in the organic forest soils, and the litter amount in varying forest types with regard to climate regions, these two carbon pools were not taken into account in calculations. Turkey has to complete the necessary document required for the Tier 3 communication level applying MRV principles if it wants to benefit from CDM funds for NAMA projects. There are many problems restricting upgrading the communication level to Tier 3 that should be investigated in Turkey.

The following studies should be finished to increase the efficiency of future national communications ([www.jrc.ec.europa.eu/](http://www.jrc.ec.europa.eu/)):

- Revision of the climatic regions map.
- Construction of biomass tables for both productive and non-productive coppice forests.
- Construction of biomass tables for poplar and other species used in plantation agriculture, such as olive, citrus, hazel and tea.
- Research into carbon quantities in organic forest soils and litter according to climatic region.
- Development of a new inventory system using satellite-based remote sensing technologies for identification and monitoring of the various land-use categories.
- Turkey has to develop a definite application strategy either to enhance carbon stocks in the forests or to take mitigation actions for reduction policy.

A research project to complete these documentation lacks was presented to The Scientific and Technological Research Council of Turkey (Turkish: Türkiye Bilimsel ve Teknolojik Araştırma Kurumu, TÜBİTAK) by the MoEF Research and Development Department, but it was not approved due to financial problems. FAO could play an important role in this issue by means of its directive projects aiming at complementary studies.

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