



United Nations Development Programme

Country: Turkey

Project Document



Project Title

Integrated approach to management of forests in Turkey, with demonstration in high conservation value forests in the Mediterranean region

UNDCS Outcome(s):

Outcome 3: Strengthened policy formulation and implementation capacity for the protection of the environment and cultural heritage in line with sustainable development principles, taking into consideration climate change, including disaster management, with a special focus on gender perspective.

Expected CP Outcome(s):

(Those linked to the project and extracted from the CP)

Outcome 3: Strengthening policy formulation and implementation capacity for the protection of the environment, and cultural heritage in line with sustainable development principles and taking into consideration climate change and disaster management

Expected Output(s):

(Those that will result from the project)

Enhanced climate-resilient, pro-poor and gender-sensitive policies, institutions and programmes are mainstreamed, developed and implemented at the national and local levels for strengthened sustainable development (CP Output 3.1)

National capacity for environmental efficiency and monitoring enhanced through improved data collection and information systems (CP Output 3.2)

Strengthening capacities for National Climate Change Adaptation Strategy and Climate Change Action Plan development and implementation with gender differentiated impacts (CP Output 3.4)

Implementing Agency:

Ministry of Forestry and Water Affairs - General Directorate of Forestry (GDF)

Implementing Partner:

UNDP Turkey

Brief Description

The project will promote an integrated approach to management of forests in Turkey, demonstrating multiple environmental benefits in high conservation value forests in the Mediterranean forest region. More particularly, the project will demonstrate approaches to generating, measuring, reporting on and verifying carbon, biodiversity and socio-economic benefits generated through this integrated approach at five Mediterranean forest sites (over a total area of 450,000 ha). It will then build on these results through the development of a forest sector NAMA covering Turkey's Mediterranean forests. Laying the foundation for leveraging and scaling up of the project's demonstration results is thus an important component of the project's strategy—one which is further made possible by a strengthened enabling environment.

Programme Period: 2011-2015

Key Result Area (Strategic Plan):
Env. & Sust. Dev.

Atlas Award ID: 00070163
Atlas project ID: 00084294
PIMS No.: 4434

Start Date: April 2013

End Date: April 2018

PAC Meeting Date: 1 February 2013

Management Arrangements: NIM

Total resources required

\$ 28,550,000

- Regular:
 - UNDP (TRAC) \$ 100,000
- Other:
 - GEF \$ 7,120,000
 - GIZ \$ 600,000
 - DKM (NCC) \$ 150,000
 - ORMUH (FCE) \$ 110,000
 - UNDP \$ 540,000

In-kind Contributions

- UNDP \$ 180,000
- Government(see Annex S) \$ 19,400,000
- ORMUH (FCE) \$ 50,000
- ORKOOP \$ 50,000
- WWF Turkey \$ 150,000
- The Gold Standard \$ 100,000

Agreed by Ministry of Foreign Affairs:

Name
N. Gökçen KAYA
Eldi
Çok Taraflı Ekonomik İşler
Genel Müdür Yardımcısı

Signature

Date

18.7.2013

Agreed by Ministry of Forestry and Water Affairs:

Dr. Mahir KÜÇÜK
Müsteşar Yardımcısı

Agreed by United Nations Development Programme:

Ramal Malhotra
Resident Representative

23/7/2013

Contents

I.	List of Acronyms	2
II.	Situation Analysis	3
III.	Strategy.....	19
IV.	Results and Resources Framework	36
V.	Total Budget And Work Plan.....	42
VI.	Management Arrangements.....	47
VII.	Monitoring Framework And Evaluation	51
VIII.	Legal Context.....	55
IX.	Audit Clause:.....	55
X.	Annexes.....	56
XI.	Additional Annexes:	60

LIST OF ACRONYMS

AFOLU	Agriculture, Forestry and Land Use
APR/PIR	Annual Project Review/ Project Implementation Reports
AWOP	Annual Wildfire Operating Plans
CLC	Corine Land Cover
CPMF	Collaborative Partnership on Mediterranean Forests
DD	Nature Association
DHKD	Turkish Association for Protection of Nature
DKM	Nature Conservation Center
ENVANIS	Inventory and Statistical Database
FAO	Food and Agriculture Organization of the United Nations
FED	Forest Enterprise Directorate
FIS Project	Forest Information System Project
GDF	General Directorate of Forestry
GDNCNP	General Directorate of Nature Conservation and National Parks
GDPNV	The General Directorate of Protection of Natural Values
GESIS	Solar panel micro-credit programme
LULUCF	Land Use, Land Use Change of Forestry
LULUCF GPG	LULUCF Good Practice Guidance
MENA region	Middle East and North Africa region
MoFWA	Ministry of Forest and Water Affairs
MRV	Measurable, Reportable, Verifiable
NAMA	Nationally Appropriate Mitigation Action
NCCAP	National Climate Change Action Plan
NCCS	Turkey's National Climate Change Strategy
NIR	National Inventory Reports
NWFPs	Non-wood forest products
ORKOOP	The Central Union of Turkish Forestry Cooperatives
ORKOY	Forest Village Relations Department
PA	Protected Area
PF	Protected Forest
PMU	Project Management Unit
QPR	Quarterly Progress Report
SFM	Sustainable forest management
SFM C&I	Sustainable Forest Management Criteria and Indicators
UNDP CO	United Nations Development Programme Country Office
UNDP RTA	United Nations Development Programme Regional Technical Advisor
UNFCCC	United Nations Framework Convention on Climate Change
WWF Turkey	World Wide Fund Turkey

SITUATION ANALYSIS

The Country Programme Document (CPD) for Turkey (2011-2015) is largely based on the Government's Ninth Development Plan (2007-2013), which outlines Turkey's long-term national development objectives directed at enhancing quality of life through an inclusive development process, and aligned to the new United Nations Development Cooperation Strategy (UNDCS) 2011-2015 for Turkey. Anchored around the current UNDAF mid-term review, two national MDG reports, an ongoing Assessment of Development Results (ADR) 2009 and thematic outcome evaluations, the new country programme strategy is built on the Corporate UNDP Strategic Plan (2006-2010) and the RBEC Rolling strategy (2010-2012) and developed in close consultations with the Government and the key development partners in Turkey.

UNDP worked closely with the Turkish Government in the integration of environmental and sustainable development principles into national and regional development plans. As per the agreed Country Program Action Plan covering the period 2011-15, UNDP in environment and sustainable development cooperation will work to enhance national capacities and promote (a) mainstreaming sustainability principles, environment, climate change and energy efficiency and renewable energy into sectoral policies, plans and programmes at national, regional and local levels, (b) climate change adaptation and mitigation and carbon trading at national, regional and local levels, and (c) expanding access to environmental and energy services for the poor, vulnerable groups and others requiring special attention. UNDP cooperation in this area will also focus on institutional and policy development capacity at all levels in sustainable land and water management, agricultural efficiency, climate resilience and energy efficiency systems, and biodiversity protection, chemicals with special attention to social dimensions, strengthening economic competitiveness and improving capacities for disaster preparedness and early warning. UNDP cooperation in this area will aim at institutional and policy capacity-building and climate resilience at all levels in sustainable land and water management, agricultural efficiency, climate resilience and energy efficiency systems and services, and biodiversity protection, with special attention to social dimensions, facilitating market transformation through clean technologies and creation of green jobs, strengthening economic competitiveness with a territorial approach and improving capacities for disaster preparedness and early warning. As recommended by the ADR, gender mainstreaming in environment and sustainable development will be further promoted.

During the preparation of the United Nations Development Cooperation Strategy (UNDCS), sustainable land management, biodiversity and climate change have been recognized as priority areas for UN Support to the Government of Turkey. The project fits the newly signed UNDP Country Program Document for Turkey and contributes to the achievement of the UNDP Outcome 3: Strengthening policy formulation and implementation capacity for the protection of the environment, and cultural heritage in line with sustainable development principles and taking into consideration climate change and disaster management.

With respect to SFM, UNDP is central to implementation of the UN-REDD program. UNDP is working in 29 countries around the world on SFM and REDD+, focusing on forest governance frameworks, planning, and monitoring. In Europe and CIS, UNDP is supporting over 60 ecosystem projects worth US\$107 million. These include sustainable forest management in a number of ecoregions, including the forests of Altai Sayan, Komi, Rhodope, the Carpathians, and Kure (Turkey). UNDP is the implementing agency for forest carbon projects in Russia and Kazakhstan for funding of the German International Climate Initiative (US\$11 million), which are testing innovative carbon mitigation techniques within protected areas. UNDP is also assisting countries in Europe to develop Nationally Appropriate Mitigation Actions under the UNFCCC. UNDP was the first agency to develop a Guidebook for countries to develop and implement Low Emission Development Strategies and NAMAs, including for the forestry sector. Turkey is one of the first countries benefitting from UNDP support under this initiative, wherein the Government of Turkey has agreed with UNDP on a programmatic approach to sustainable forest management. UNDP has a proven track record in establishing and supporting the management of protected areas. More than 30 UNDP-GEF projects in 17 countries in Europe address protected areas covering a total area of 13.1 million hectares. New PAs have been established, totaling 2.6 million hectares; 85 PAs are in the process of being established, totaling 0.81 million hectares; 126 PAs strengthened, totaling 9.7 million hectares.

Under the UN-REDD Programme, UNDP maintains expertise on carbon measurements, monitoring and verification. While the ecological regions covered by UN-REDD are different, the overall approach and guidance of UNFCCC and its working groups with respect to REDD readiness (including MRVs, accounting, project development, safeguards), are standard for all types of forest regions, therefore the in-house expertise of UNDP is transferable and will be applied for the purposes of this project. UNDP strength vis-à-vis its partners within the UN-REDD program, including for the design and installation of carbon monitoring systems, rests with its presence on the ground, strong connections with Government and NGOs, ability to quickly create local capacities and implement country or even region-tailored activities. UNEP and

FAO on the global level are providing best expertise to the design of the theoretical principles of REDD MRVs, yet UNDP within the UN-REDD partnership, is delegated with capacities and expertise to translate this guidance into action at the country level.

Turkey's National Climate Change Strategy (NCCS), which was approved by the Higher Planning Council Decision of May 03, 2010, sets forth national strategy, main principles, targets and an action plan related to negotiations, technology transfer, finance, capacity building, public awareness and education and infrastructure and adaptation strategy to climate change. Within the scope of land use and forestry, the strategy deals with afforestation and protection measures and research and development actions in the short term; national reforestation mobilisation and biomass-based energy production in the medium term, and; increasing green belt and establishing protected areas in metropolitan areas in the long term.

The present project supports implementation of the following strategic goals of the National Climate Change Strategy:

“Status of forestry in Turkey is assessed...focusing on deforestation and forest degradation, which have critical importance in terms of mitigating climate change”;

“Scientific studies will be carried out to assess climate change impacts on forest ecosystems and to identify potential adaptation strategies in this regard, and policies will be developed based on these studies”; and

“A central geographic information system shall be established for all land use classes in Turkey in order to prepare the Greenhouse Gas Inventory and National Inventory Report in line with guidelines from the Intergovernmental Panel on Climate Change (IPCC).

The project is also in line with the National Climate Change Action Plan (NCCAP), which was developed with core funding and technical assistance from UNDP and adopted by the Government in July 2011. The recommendations of the NCCAP point to the need to develop a Nationally Appropriate Mitigation Action (NAMA) in the forest sector, as well as a carbon assessment methodology and related demonstration activities. In this regard, the Government of Turkey submitted a request to COP 16 (FCCC/AWGLCA/2010/MISC.8) which reiterated its self-identification as a developing country for the purposes of carbon trading mechanisms. In response, the Ad Hoc Working Group on Long-term Cooperative Action (AWG-LCA) issued the following decision at COP-16: “the COP Requests the Ad Hoc Working Group on Long-term Cooperative Action under the Convention to continue consideration of these issues with a view to promoting access by Turkey to finance, technology and capacity-building in order to enhance its ability to better implement the Convention.” Turkey is thus fully eligible for support in the development and implementation of NAMAs. However, a successful forest sector NAMA will require an effective carbon assessment methodology, data-base, institutional capacities and demonstration activities. This makes the proposed GEF project strategy highly relevant. The project will establish the technical know-how and management framework needed to implement mitigation activities in the Mediterranean forests.

The project builds upon lessons learned and good practices identified under the completed WB/GEF Biodiversity and Natural Resource Management Project (BNRMP) which aimed at addressing systemic areas to be improved that compromise effectiveness of the national system of protected areas such as deficiencies in the Environment Law, Range Law, Hunting Law, and Tourism Encouragement Law. The proposed project will further advance work of the BNRMP by expanding protection in Mediterranean forest ecosystems. Further, the project is additional to the current UNDP-GEF MSP initiative focused on expanding protection around the Kure National Park. Kure's main habitats include old-growth coniferous, chestnut and boxwood forests, interspersed with grasslands and karsts. This project addresses conservation needs in a different forest community—facing a different menu of threats (e.g. unsustainable fire wood collection and wild-fires are characteristic of the Mediterranean coast, while Kure suffers from encroachment of infrastructure, commercial overharvesting, conversion of land to agriculture, and the discharge of municipal solid waste and waste-water). The preparation and implementation of the GEF project is coordinated with FAO sub-regional office in Ankara, the GIZ-funded regional program “Adapting forest policy conditions to climate change in the Middle East and North Africa (MENA) region” and Collaborative Partnership on Mediterranean Forests (CPMF) working under *Silva Mediterranea* of FAO. The GEF project will employ rich expertise of this GIZ program and the *Silva Mediterranea* network, in the design of policies and tools for multiple-use forest management. It will benefit also from its cooperation with ‘Collaborative Partnership on Mediterranean Forests’ under *SilvaMediterranea* of FAO which is a multi-country initiative promoting networking among experts and decision making in the Mediterranean forest region where UNDP Turkey is a partner.

The project is a logical extension to a number of key initiatives undertaken by UNDP in Turkey. UNDP Turkey, Ministry of Forestry and Water Affairs, Nature Conservation Center, Chamber of Forest Engineers and WWF-Turkey have collaborated since 2008 in the related arenas of forest protected areas, sustainable forest management, and climate change under several projects including UNDP-GEF project “Enhancing coverage and management effectiveness of the subsystem of forest protected areas in Turkey’s national system of protected areas”. Since 2010, UNDP Turkey initiated a grant modality with GDF, in collaboration with a private company, BTC Co. The grant modality focuses on the local implementation of Sustainable Forest Management. The SFM criteria and indicators at local level will be identified and required capacity development activities will be undertaken among forest SMEs, local communities and GDF local branches. In 2012, UNDP Turkey and GDF were awarded a new project by the British Embassy to enhance GDF’s capacity on forest and water relations in the context of Sustainable Forest Management with focus on climate change, disaster risk management and afforestation/reforestation programmes. With respect to climate change and forestry, UNDP Turkey is playing a leading role in the preparation of the national climate change strategies. Inter alia, UNDP is supporting the development of the National Climate Change Action Plan, development of the Nationally Appropriate Mitigation Action (NAMA) for the forestry sector, and initiatives aimed at mainstreaming gender and democratic governance into climate change strategies. In recognition of the substantial contribution that UNDP has made towards sustainable forest management, the Government of Turkey has requested UNDP to develop a programmatic approach to SFM; melding Government and donor resources to advance sustainable forest management. This is a product of the aforementioned activities between the Government and UNDP country office. The UNDP Country Office recently assigned a new staff as Sustainable Forest Management Advisor to improve existing collaboration with GDF and create new opportunities for dissemination at regional level.

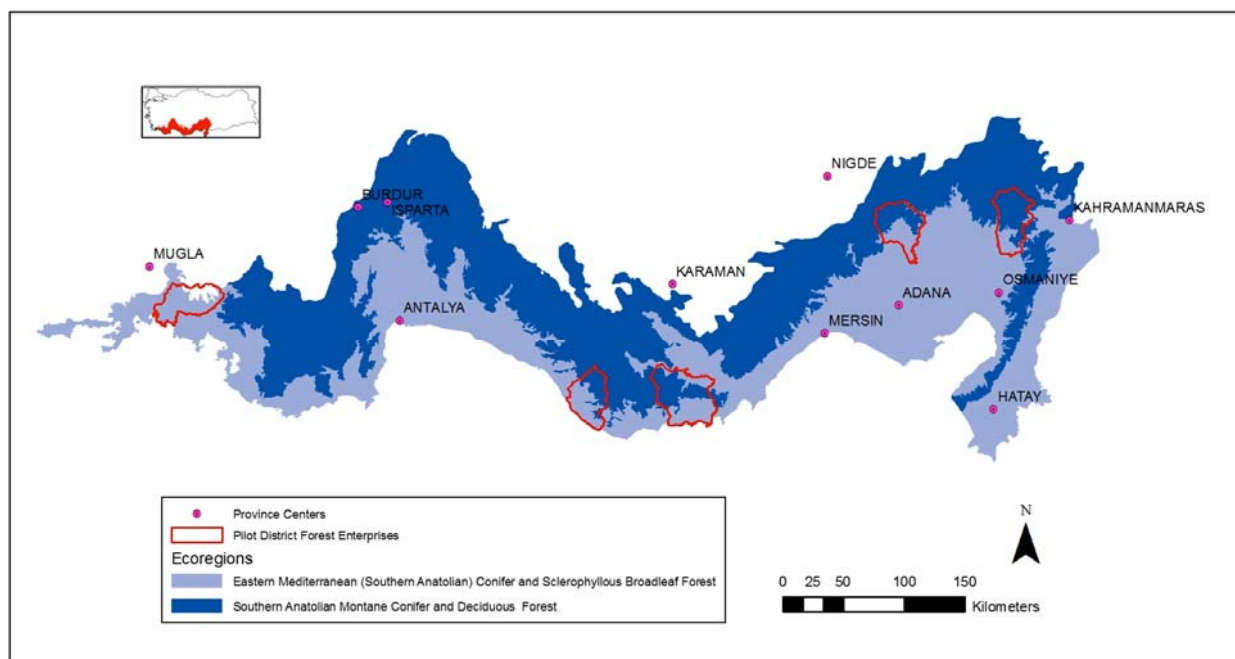
Finally, the project will contribute to the Government’s efforts to create a bio-geographically representative national system of protected areas, as codified in the National Biodiversity Action Plan (2008). It will likewise help Turkey meet the protected area targets laid out in the Global Strategic Plan on Biodiversity 2011-2020. The project also advances the country’s commitments under the Gift to the Earth declaration, whereby the Government pledged to extend PAs in nine identified forest landscapes, currently under-represented within the PA estate, five of which are within the Mediterranean forest directorates covered under this project.

Forests cover about 27 percent of Turkey (21.2 million ha). Turkey’s Mediterranean forests (hereafter also referred to as ‘the project area’) cover an area of 9.4 million hectares in total, extending from the southwest of Turkey to the Amanos Mountains in the east of the country (see **Map 1**). The project area is dominated by the Taurus Mountains, which extend from west to east in four main chains: Western Taurus Mountains, Middle Taurus Mountains, Eastern Taurus Mountains and Amanos Mountains. Aladağlar (3756 m.) is the highest point of the Taurus Mountain ranges. Structurally, these are predominantly coniferous forests, accompanied by maquis formations along the coastal areas. Coverage of deciduous forests is less than five per cent. The Mediterranean forests are moderately fragmented due to past logging activities, yet in some parts (especially in the southernmost regions) relatively large continuous forest tracts remain. Mediterranean forests are listed as one of the global biodiversity hotspots of the world¹ due to their exceptional biodiversity richness. Approximately five per cent of the flora of Mediterranean Basin is endemic².

¹ Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B. & Kent, J. Biodiversity hotspots for conservation priorities. *Nature* 403, 853–858 (2000)

² Myers, N. Threatened biotas: hotspots in tropical forests. *The Environmentalist* 8, 178–208 (1988).

Map 1: The project area and pilot Forest Enterprise Directorates (FED) from west to east (Koycegiz FED, Gazipasa FED, Gulnar FED, Pos FED, Andirin FED)



The mountain forests of the Mediterranean region have some of Turkey's oldest trees (500-1,000 years old). These forests constitute the largest forest carbon repository in West Asia and the second largest in Southern Europe³. They store an estimated 304 tCO₂/ha in above-ground biomass, and 54 tCO₂/ha below ground; under natural conditions, their net annual sequestration rate is 7 tCO₂/ha/year⁴. The total carbon pool in Turkey's Mediterranean forests is currently estimated at over two billion tC⁵. Illicit logging, fires, and pests cause annual sequestration rates to fluctuate: in 1990 the forests were a 41.7 million tCO₂ net sink; by 2000, the net forest sink increased to 62.3 million tCO₂⁶, remaining stable or slightly increasing for the next several years before going down in 2006; this was followed by a slight increase in the period 2007-2008 due to the introduction of controls on logging; but fell sharply in 2009 and 2010 due to widespread forest fires.

Turkey's Mediterranean forests are important for their biodiversity due to woody species richness, habitat diversity, wildlife, butterfly species richness, plant species richness and the existence of enclaves⁷. Turkish Caucasus and Mediterranean areas support the most diverse forest ecosystems in Turkey⁸. In particular, the Taurus Mountains, harboring Turkey's Mediterranean forest ecosystems within the project area, are accepted as centers of plant endemism⁹.

Coniferous forests and maquis formations are the main forest types within the project area. *Pinus nigra* subsp. *pallasiana* (1000-1800 m), *Cedrus libani* (900-1800 m), *Abies cilicica* (1500-1800 m), *Juniperus excelsa*, *Juniperus foetidissima* (1700-2000 m). *Cedrus libani* is an eastern Mediterranean endemic, with its main distribution and the most intact forests in the project area. *Abies cilicica* subsp. *cilicica* is another endemic taxa distributed in the Eastern Mediterranean part of Turkey. According to Zohary¹⁰, more than 40 additional sclerophyllus species contribute to the maquis formation. Dominant species of the maquis

³ Based on Global Forest Resources Assessment 2000 by FAO, and hence based on FAO's definition of forests.

⁴ Quantifying Carbon Budgets Of Conifer Mediterranean Forest Ecosystems. By [Fatih Evrendilek](#), et.al. Environmental Monitoring and Assessment V. 119

⁵ Calculated on the basis of data presented in the Report of the UNFCCC on the in-depth review of the First National Communication of Turkey. No precise direct calculations are available.

⁶ The First National Communication of Turkey attributes this to a slow-down in rural development

⁷ Ülgen, H., Zeydanlı, U. 2008. Orman ve Biyolojik Çeşitlilik. Doğa Koruma Merkezi. Ankara.

⁸ Myers, N., Mittermeier, R. A., Mittermeier, C. G., da Fonseca, G. A. B. & Kent, J. Biodiversity hotspots for conservation priorities. Nature 403, 853–858 (2000),

Gil P.R., Mittermeier R.A., Hoffmann M., Pilgrim J., Goettsch-Mittermeier C., Lamoreux J. and Da Fonseca G.A. 2004. Hotspots revisited. CEMEX, Mexico City.

⁹ Boulos L., Miller, A.G. & Mill, R.R. 1994. South West Asia and the Middle East in Davis, S.D., Heywood and V.H., Hamilton, A.C. (eds), Centers of Plant Diversity. Information Press, Oxford.

¹⁰ Zohary, M. 1973. Geobotanical Foundations of the Middle East, 2 vols. Fischer, Stuttgart, and Sweets and Zeitlinger, Amsterdam.

formations are *Arbutus andrachne*, *Laurus nobilis*, *Myrtus communis*, *Olea europaea* var. *sylvestris*, *Phillyrea latifolia*, *Pistacia lentiscus*, *P. terebinthus*, *Styrax officinalis*, *Quercus coccifera*, *Q. infectoria* and *Myrtus communis*

Given the small percentage of deciduous forests (less than five per cent) within the project area, these should be considered a significant element of forest biodiversity due to their contribution to habitat diversity. Dominant deciduous species include: hornbeam *Carpinus orientalis*, hop hornbeam *Ostrya carpinifolia*, oaks (*Quercus cerris*, *Q. vulcanica*, *Q. pubescens*, *Q. robur*, *Q. libani*, *Q. trojana*, *Q. petraea pinnatifolia*), and many maple species (*Acer hyrcanum*, *A. platanoides*, *A. campestre*, *A. monspessulanum*). In the Western Taurus mountains, the most prominent deciduous formation is an endemic forest formed by the *Liquidambar orientalis*, located in the floodplain areas of Köyceğiz.

The project area covers portions of four centers of plant diversity and endemism as defined in ‘Centers of Plant Endemism’:¹¹

- South West Asia 12 Anti-Taurus Mountains and Upper Euphrates (Irano-Turanian),
- South West Asia 15 Isaurian, Lycaonian and Cilician Taurus (Mediterranean),
- South West Asia 16 South-west Anatolia (Mediterranean),
- South West Asia 17 Levantine Uplands (Mediterranean).

According to the Important Plant Areas study¹², there are 36 Important Plant Areas (IPA) covering 2,381,540 hectares in the project area. The western and eastern Taurus together support a total of 2,500-3,000 plant taxa, including more than 1,000 endemics. There are an estimated 1,177 endangered plant taxa in the region, along with 128 widespread endemics and 139 restricted range endemics¹². The mountains are rich in large mammals, largely due to the difficult terrain, which limits the extent of human impact. Brown bear (*Ursus arctos*), gray wolf (*Canis lupus*), golden jackal (*Canis aureus*), lynx (*Lynx lynx*), and caracal (*Caracal caracal*) are the main carnivores of interest. Wild goat (*Capra aegagrus*) and fallow deer (*Dama dama*) are also found. Ironically, the fallow deer introduced in Europe in the 15th century were from southern Anatolia, but the local native population is now reduced to around 50-100 individuals at Duzlerçamı Fallow Deer Breeding Station (Antalya). A more detailed description of the biodiversity values of the project’s pilot demonstration sites can be found in Site Data Sheets presented in Annex F.

Threats and causes

As noted above, Turkey’s Mediterranean forests provide important global and national benefits related to carbon storage and biodiversity, along with other natural products and ecosystem services. Despite these values and benefits, however, the Mediterranean forests face several threats. Fortunately, large-scale deforestation ended in the late 1990s. However, about three million ha of the Mediterranean forest area have suffered from severe degradation due to past economic activities. Some of these ‘forests’ currently have a crown density of less than 10 percent¹³. However, many areas have moderate-to-high regeneration potential, which if were allowed to occur, and in some areas be complemented by reforestation, would enable significant carbon build-up and connect currently fragmented forest patches.

Currently, the main threats to Mediterranean forests derive from anthropogenic wildfires, unsustainable fire wood collection by local villagers, illicit timber harvests and pests. These threats have impacts on multiple forest values associated with the ecosystem goods and services which they provide. Of particular interest to the present project are damages related to the loss of globally significant ecosystem services associated with climate change mitigation and biodiversity.

¹¹ Davis S.D. and Heywood V.H. (1994-1997): Centres of Plant Diversity: A Guide and Strategy for Their Conservation (3 volumes). IUCN Publication Unit, Cambridge, UK.

¹² Özhatay, N., Byfield, A., Atay, S. 2003. Türkiye’nin Önemli Bitki Alanları. WWF Türkiye, İstanbul

¹³ These are still classified as forests by Government, although this runs contrary to FAO definition of forests.

Fuelwood removals

Fuelwood removals may be broken down into three main categories: (i) subsidized timber sales, (ii) illicit logging, and (iii) collection of residuals. Subsidized timber sales are discussed in the baseline section below. In addition to subsidized, legal fuel wood removals, annual commercial illegal logging across Turkey is estimated at around 71,000 m³. However, commercial illegal logging appears to be on a downward trend in recent years. Commercial illegal logging is dealt with by the Government through baseline programs, including tightening of controls over companies, increasing penalties and improving prosecution for malfeasance.

Table 2 below shows fuelwood use by forest villages in the pilot demonstration sites based on a combination of subsidized sales, illegal logging and collection of residuals.

Table 2: Estimated fuelwood removals at pilot demonstration sites

Forest Enterprise Directorate	Forest Villages			Illicit logging in m3	Collection of residuals in m3	Total fuelwood used annually by forest villagers at demonstration sites (est.) in m3
	Number of villages (2009)	Total population (2009)	Below-cost (subsidized) fuelwood sales in m3 (2009)			
POS	26	13,435	8,586	2,646	2,117	13,349
GAZİPAŞA	41	24,142	1,707	526	421	2,654
ANDIRIN	53	29,962	12,536	3,863	3,091	19,490
GÜLNAR	22	6,196	501	154	124	779
KÖYCEĞİZ	17	14,250	1,007	310	248	1,566
Total	159	87,985	24,338	7,500	6,000	37,838

The amount of legally procured fuelwood (24,338 m³ as of 2009) should be increased by about 30% (i.e. almost 7,500 m³) in order to account for illicit logging in the pilot sites.¹⁴ Illicit logging is known to have decreased dramatically in the past two decades, both in Turkey as a whole and in the Mediterranean region in particular.

In addition, forest villagers are allowed to collect the residuals of timber harvest and forest tending as fuelwood. While this is technically not an illicit action, neither is it a formal, planned and recorded mode of utilization. Based on the observations and experiences, this type of fuelwood collection is estimated at about one fourth of the quantity of fuelwood formally provided to forest villagers as subsidized sales, i.e., 25 per cent of 24,000 m³, or about 6,000 m³.

Altogether, forest villagers in the pilot demonstration sites are estimated to consume some 38,000 m³ of fuelwood annually.

Pests

In Turkey's Mediterranean forests, about 45 to 50 species of insects and harmful fungi damage trees to varying degrees of severity in an area of approximately two million hectares (which makes up 10% of the whole forest cover) every year. While some of these cause damage to all organs of the tree, particularly to its leaves, others, especially bark beetle (Scolytinae) as well as other xilofages, cause individual, collective and even mass tree deaths in forests that have become vulnerable due to one reason or another. Forests of coniferous trees are more significantly affected by harmful factors, since they are more sensitive to pests and other sorts of damages. Areas most affected by pests are the monoculture forests of coniferous species, particularly red pine, which have been planted on large areas in order to meet the demand for wood raw

¹⁴ This estimate is based on interviews with local forestry staff.

material. It is estimated that every year, approximately one million m³ of wood products are wasted because of pests.

Insects are represent the most harmful factor affecting Mediterranean forests, especially those made up of coniferous trees. Species having the greatest impact in red pine forests, which is the main and the most widely grown tree of the region, and also in black pine forests, include the Pine Processionary Moth (*Thaumetopoea wilkinsoni*) and the Mediterranean Pine Engraver (*Orthotomicus erosus*). In addition, Six-Toothed Bark Beetle (*Ips sexdentatus*), Mediterranean Pine Shoot Beetle (*Tomicus destruens*), Resin moth (*Dioryctria sylvestrella*) and in the forests of Muğla, *Marchalina hellenica*, are also problematic. *M. hellenica* differs from other pests, however, due to its importance to local beekeepers for pine honeydew production.

The most important threats for forests of Taurus Cedar (*Cedrus libani*), which is one of the most important species of trees in the Mediterranean forests, are Cedar Leaf Moth (*Acleris undulana*) and Cedar Bark beetle (*Orthotomicus tridentatus*). Due to the harm caused by *A. undulana* larva, a significant loss in tree needles has been observed, resulting in reduced growth. In addition, *O. tridentatus*, which has spread to cedar forests throughout the Taurus Mountains, leads to a significant degree of withering in weak trees.

In forests made up of Cilicia Fir (*Abies cilicica*), which is the most delicate tree type in the Mediterranean ecosystem and has suffered increasing rate of deaths in the recent years, the impact of global warming has increased and this species, with high humidity requirements, is now endangered in many regions. Drought in particular is a serious source of distress for Cilicia Fir species, which have high humidity requirements. Withering is significant outside the optimum growing environment and particularly at low altitudes. Once the trees become physiologically weak, Fir Bark Beetle (*Pityokteines marketae*) proves more harmful and epidemics strike in various regions. Especially the temperature rise since early 1990s and dry seasons have accelerated the deaths of *Abies*.

Overall, increases in the average annual temperature associated with climate change have significant effects on forest ecosystems and provides the right environment for organic agents such as insects and fungi etc. to cause damages and more frequent epidemics.

Fires

About 12 million ha of Turkey's forested lands are subject to, and under threat of, forest fires. Every year thousands of hectares of forest land are consumed, resulting in millions of dollars in suppression costs and causing great damages in lost timber, real estate and recreational values, and even loss of life. In the last ten years, average annual suppression cost and damages due to fires have been 173 million USD and 40 million USD, respectively. Fire statistics kept by the General Directorate of Forestry (GDF) since 1937 show that a total of 90,000 fires have burned approximately 1.6 million hectares of forest land (see **Figure 1**). This represents 1,200 fires on 22,000 hectares annually, with an average area burned per fire of 18 hectares. Large-scale fires in 2004, 2009, and 2010 destroyed over 10,000 ha of high conservation value forests, including Calabrian pine, which represented a significant loss of habitat of endemic and threatened forest species

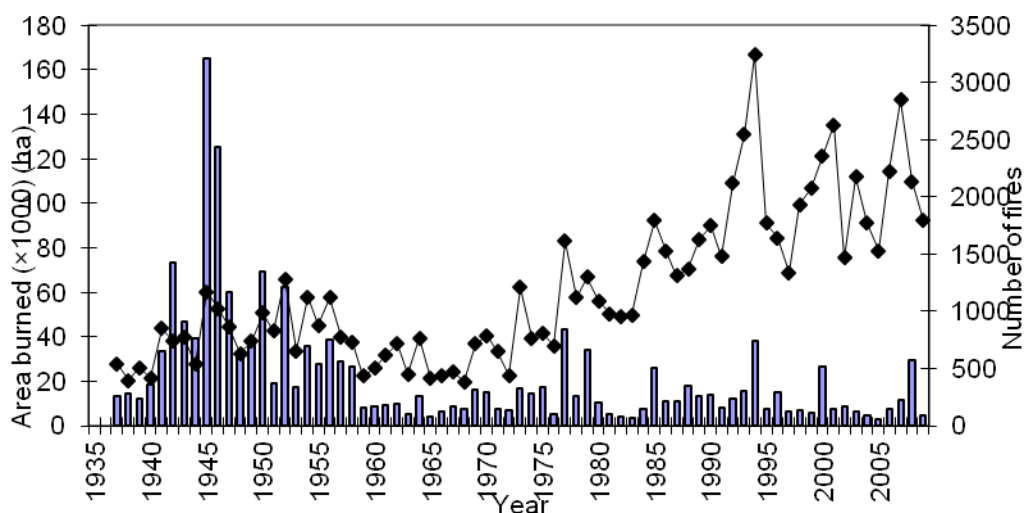


Figure 1: Area burned (bars) and annual numbers of fires (line) since 1937

About 65% of Turkey's forest fires occur along a 160 km-wide belt along the Mediterranean and Aegean regions, extending from Antakya in the south to Istanbul in the northwest. Statistics indicate that 70% of all fires in these regions are surface fires, 20% passive crown fires and 10% active crown fires. In terms of area burned, surface fires account for 20%, passive crown fires 45%, and active crown fires 35% of the total. Given these figures, it is estimated that 782,000 tCO₂-eq¹⁵ is released annually as a result of fire activity in Turkish forests in these regions.

As elsewhere, fire in Turkey has complex social, economic, ecological and cultural roots. Fire management has evolved around an effective fire protection policy with a heavy emphasis on fire control, but with little regard for socio-economic or ecological aspects of fire. Recent fire statistics indicate that the majority of forest fires in Turkey are caused by people. Fires having anthropogenic origins account for 95 to 97 per cent of all fires, while natural causes are responsible for the remaining 3 to 5 per cent. Of the fires caused by people, 13 per cent are classified as arson, 45 per cent as negligence and carelessness and 37 per cent as 'unknown'. Arson fires are set for various reasons. Fires are set to clear land for farming, to release potash into the soil to improve grazing or by honey collectors. Other fires result from personal or ownership conflicts. Unintentional fires are generally caused by sheer inadvertence or accident.

Land use and land use change in fire affected areas dramatically change the natural fire regimes that have helped to shape local environments; such changes can have detrimental effects on the functioning of ecosystems. Various developments in recent years have had a direct effect on forest ecosystems and, thus, on forest fires. These include: the use of natural gas for energy needs, increasing recreational activities (tourism), abandonment of lands formerly used for agricultural purposes, the expansion of residential areas into woodlands and the ban on grazing in forests.

The long-term solution envisaged by the Government of Turkey is to secure the highly valuable Mediterranean forests by taking a landscape approach to conserve carbon pools and biodiversity.

Institutional aspects, baseline context and areas to be improved

This section presents the institutional and baseline context and areas to be improved in key thematic areas direct related to the long-term objective defined above. These include:

- Enabling environment for multiple use forest management,
- Forest land management and planning (excluding protected areas),

¹⁵ Excluding post fire emissions and rehabilitation potential.

- Protected area systems management and biodiversity conservation,
- Forest information management / inventory,
- Forest fire management and control,
- Pest control,
- Fuelwood removals,
- Silviculture.

For each of the above thematic areas, the following issues are discussed: (i) institutional aspects, (ii) baseline activities and (iii) areas to be improved.

Enabling environment for multiple-use forest management

Institutional aspects: There are two ministries responsible for climate change and biodiversity conservation in Turkey:

(i) The Ministry of Environment and Urbanization, which has two units responsible for climate change and biodiversity issues, respectively. These are the General Directorate of Protection of Natural Values (GDPNV), which is responsible for identification and designation of protected areas and the Climate Change Department, which is under the General Directorate of Environment Management and is responsible for climate change issues.

(ii) The Ministry of Forest and Water also has two relevant departments, namely: (a) the General Directorate of Nature Conservation and National Parks (GDNCNP), which is responsible for management of protected areas, including those within forest ecosystems¹⁶, and; (b) the General Directorate of Forestry (GDF), which is responsible for managing all forests belonging to the State (i.e. 99 per cent of forests in Turkey) according to Law of Forest and according to sustainable forest management criteria and indicators (SFM C&I). GDF has also been designated as National Coordinator for LULUCF by the National Climate Change Board and has the responsibility to prepare national and international LULUCF reports and database. SFM C&I identified by GDF includes biodiversity and climate change targets.

Baseline activities: In late 2011, GDF established a new Department for Forest Ecosystem Services, including a new unit for biodiversity. The establishment of this new department and unit signals the Government's intention to promote biodiversity conservation in forest ecosystems in a more institutionalized manner. In 2009, GDF established a working group on LULUCF and Biomass to coordinate LULUCF and forest carbon activities at national and international level. However, the working group was not activated appropriately.

Areas to be improved: Existing LULUCF and forestry policies need to be improved to enable Turkey to undertake multiple-use forest planning and ecosystem-based mitigation. As a result, forest ecosystem services are not accounted for in forest management, in a comprehensive way. With respect to carbon mitigation opportunities, overarching policy and action plan need to be improved. Turkey does not have fine-scale data on carbon sequestration potential in forest pools. Existing carbon data is too generic and in many instances outdated and field verifications remain limited. Detailed studies on individual threats (forest fires, pests, etc.) and ecosystem resilience to climate change need to be improved. Only one study, covering a limited area, has assessed the impact of climate change on forest ecosystems, while identifying vulnerabilities.¹⁷ While the IPCC default values are usually applied in UNFCCC reporting, these need to be adjusted on a country-basis to provide reliable results and meet international standards. GDF is currently preparing to update the GHG inventory with data on LULUCF. However, this research is sophisticated, and related national capacities are scarce. Overall, GDF needs technical and policy support to elaborate LULUCF issues under the NCCAP. Finally, Turkey's capacity to design and implement carbon mitigation and sequestration strategies need to be enriched; its institutions need training and knowledge on LULUCF and carbon monitoring and accounting.

Forest land management and planning (excluding protected areas)

¹⁶ Formerly a single ministry, these two created by Decree 644 of 4 July 2011.

¹⁷ This study was undertaken by the Nature Conservation Centre and Adana Regional Forest Directorate with UNDP's support, in Seyhan Basin.

Institutional: As noted above, almost all of Turkey's forests (~ 99 %) belong to the state. GDF is the only responsible institution for management of State forests in Turkey. According to its website, "GDF's fundamental mission is to protect forest resources against any threats and danger, to enhance forest resources in a nature-friendly manner and to achieve sustainable forest management at a level that will provide far-reaching sustainable benefits for society in ecosystem integrity." In seeking to fulfill this mission, GDF works at central and local level. At central level, GDF has 21 Departments. At this level, GDF's Forest Management and Planning Department is directly responsible for preparation of management plans. At local level, GDF includes 27 Regional Directorates, each of which is further sub-divided into five or more Forest Enterprise Directorates (FEDs); altogether, there are 249 FEDs in Turkey. A final hierarchical level is that of Forest Enterprise Sub-Directorates, where 10-year forest management plans developed at FED level are implemented.

Baseline: Until recent years, the main and often sole purpose of forest management in Turkey was timber production. However, the last 10 years have seen the beginnings of a paradigm shift in forest management. There have been important developments concerning the integration of sustainable forest management criteria into forest management. Services other than timber production have started to be considered under the concept of 'functional forest management planning'. This process was initiated after the 1993 Ministerial Conference for the protection of Forests in Europe in Helsinki (also known as the "Pan-European Forest Process").

In a related development, GDF began work on development of 'Sustainable Forest Management Criteria' in 1999. Out of six criteria developed to date, the following are directly related to protection of forests and related ecosystem services:

Criterion 2: Maintenance, conservation and appropriate enhancement of biological diversity in forest ecosystems,

Criterion 3: Maintenance of forest ecosystem health, vitality and integrity,

Criterion 5: Environmental and Protective Functions of the Forests.

Following the integration of sustainable forest management criteria into forest management, the forest management planning approach has also changed. In a process led by the Department of Forest Management Planning, services other than timber production are beginning to be integrated into the forest management planning process. Since 2006, forest management plans with special emphasis on ecosystem services have been prepared in eight forestry units: İğneada (2006), Bulanıkdere (2006), Camili (2006), Köprülü Kanyon National Park (2006), Yalnızçam (2008), Uğurlu (2008), Yukarı Gökdere (2008), Yusufeli (2010), Altıparmak (2010) and Şavşat (2011).

Areas to be improved: Although GDF has adopted a policy towards forest management planning that enables the integration of services other than timber production, e.g. biodiversity and climate change mitigation/adaptation, expertise and know-how are limiting factors for full implementation of this system and thereby need to be improved for the full integration of biodiversity conservation and climate change mitigation concerns into the forest management system and daily management practices. Institutional capacity and legal framework need to be improved for planning efforts needed to make functional management truly effective. In addition, the infrastructure for identifying important biodiversity areas and climate change mitigation actions within the functional forest planning framework need to be strengthened. Finally, the existing database for forest management plans need to be improved to include LULUCF requirements.

Protected area systems management and biodiversity conservation

Institutional aspects: As noted above, protected areas are under the jurisdiction of the General Directorate of Nature Conservation and National Parks (GDNCNP). Once a forest site is declared a protected area, it comes under the jurisdiction of GDNP.

Baseline management activities: Turkey's national protected areas system covers 4.6 million ha, or about six per cent of the terrestrial area. A total of 10 National Parks, 10 Nature Reserves and eight Special Protected Areas (SPAs) are located within the Turkey's Mediterranean region. As far as forest ecosystems are concerned, some 3.8 million ha of forest area are under protection: approximately 810,000 ha. are under protection according to 2873 National Parks Law and under the jurisdiction of GDNCNP, while the

remaining three million ha. are protected under forest management plans and are under the jurisdiction of GDF.¹⁸

The following protected areas are found within the five pilot demonstration FEDs: Köyceğiz-Dalyan SPA, Kartal Lake Nature Reserve, Muğla Köyceğiz Wildlife Reserve (which are located within the Köyceğiz FED), Aladağlar National Park (which is in Pos FED) and Körçoban Nature Reserve (in Andırın FED).

Table 3 below highlights key areas for biodiversity located within the pilot FEDs.

Table 3: Important biodiversity areas within the five pilot FEDs¹⁹

Name of the Area	Feature/Status	Date	Institution	Size (ha)	Project Site/FED
Köyceğiz Gölü ve Dalyan	Important Plant Area	2005	WWF-Turkey/DHKD	43,323	Köyceğiz
Sandras Mountain	Important Plant Area	2005	WWF-Turkey /DHKD	112,793	Köyceğiz
Kayranlı Mountain	Important Plant Area	2006	DHKD	9,975	Andırın
Aladağlar	Important Plant Area	2005	WWF-Turkey /DHKD	203,656	Pos
Köyceğiz Lake	Important Bird Area	2004	DD	14,000	Köyceğiz
Aydıncık Islands	Important Bird Area	2004	DD	2,102	Gülнар
Aladağlar	Important Bird Area	2004	DD	215,400	Pos
Amonos Mountains	Important Bird Area	2004	DD	362,500	Andırın
Sandras Mountain	Key Biodiversity Area	2006	DD	133,760	Köyceğiz
Köyceğiz Lake	Key Biodiversity Area	2006	DD	39,887	Köyceğiz
Gazipaşa-Anamur Coast	Key Biodiversity Area	2006	DD	27,618	Gazipaşa
Gülнар	Key Biodiversity Area	2006	DD	17,571	Gülнар
Aydıncık-Ovacık Coast	Key Biodiversity Area	2006	DD	26,459	Gülнар
Aladağlar	Key Biodiversity Area	2006	DD	243,999	Pos
Gülнар	Prime Butterfly Area	2011	DKM	10,000	Gülнар
Aladağlar	Prime Butterfly Area	2011	DKM	10,000	Pos
Aladağlar Forests	Anatolian Diagonal Systematic Conservation Planning (Gap Analysis)	2010	DKM	50,000	Pos
Aladağlar Mountain	Anatolian Diagonal Systematic Conservation Planning (Gap Analysis)	2010	DKM	80,000	Pos
North of Andırın	Anatolian Diagonal Systematic Conservation	2010	DKM	10,000	Andırın

¹⁸ GDF 2006. GDF Strategic Plan

¹⁹ As many of the identified area overlap, no total is provided.

Name of the Area	Feature/Status	Date	Institution	Size (ha)	Project Site/FED
	Planning (Gap Analysis)				
Köyceğiz	Mediterranean Systematic Conservation Planning (Gap Analysis)	2005	WWF-Turkey/DKM	40,000	Köyceğiz
Köyceğiz-Dalyan	Specially Protected Area	1988	GDPNV (Formerly ASPA)	46,146	Köyceğiz
Aladağlar	National Park	1995	GDNCNP	54,524	Pos
Körçoban	Nature Reserve	1993	GDNCNP	580	Andırın
Kartal Lake	Nature Reserve	1994	GDNCNP	1,309	Köyceğiz
Köyceğiz	Wildlife Reserve	2003	GDNCNP	29,026	Köyceğiz

Areas to be improved: Turkey has conducted gap analyses covering seven geographical regions—each roughly seven to eight million hectares in size—and has designed a national-level process to fill identified gaps, based on systematic conservation planning. The Mediterranean Gap Analysis (1999-2005)²⁰ is one of the earliest of these regional-scale gap analyses. Along with more recent studies, such as the National Biodiversity Strategy and the Key Biodiversity Areas report, the report recognizes that many ecosystems, including Mediterranean forests, remain underrepresented in the PA system. The total extent of forest protected areas in the Mediterranean forest enterprise directorates amounts to just five per cent of the areas of highest biodiversity significance—well below the area needed to meet biodiversity conservation targets. The figure also compares poorly with a challenging target set at the CBD CoP in Nagoya 2010, namely that PA coverage in terrestrial ecosystems should be at least 17%.²¹

One regulatory factor limiting the expansion of PA system is that a potentially useful category of protected area known as “protected forest”,²² currently only covers areas threatened by natural disasters including avalanche, landslide and erosion. Expanding these criteria would provide GDF with a potentially important mechanism for assigning protected status to areas with high biodiversity and/ or carbon significance.

Beyond the issue of representation and PA system extent is the question of conservation effectiveness. Many forest PAs lack management plans, clearly demarcated borders and capacitated staff. Among the most critical factors limiting the effectiveness of forest PAs, however, relates to their steadily increasing geographic isolation. Many PAs, e.g. Körçoban Nature Reserve in K.Maraş (580 ha), Tekkoz-Kengerlidüz Nature Reserve in Antakya (172 ha), Alacadağ Nature Reserve in Antalya (427 ha) and Güllük Dağı National Park in Antalya (6,702 ha), are simply too small to maintain effective population size and ecological processes of key species and habitats without integration into the wider production landscape. Such integration is essential to the sustainability and effectiveness of these PAs; yet little conservation thinking or planning takes place at this broader landscape level. Indeed, the surrounding landscape often includes threatening but relatively unchecked activities such as tourism, mining and energy sector, i.e. hydropower plants.

The fact that the lands surrounding many forest PAs consist of forested landscapes managed by GDF creates an important, yet largely untapped potential for increasing PA system sustainability. These PAs should be managed in coordination with surrounding forest landscapes, a fact which should in turn be reflected within forest management plans. Such coordination should also extend to surrounding municipalities to define corridors, buffer zones or conservation restrictions applicable therein. Instead, these forests are mostly managed for timber production and their role in directly supporting biodiversity and providing connectivity for PAs is in jeopardy as local forestry units fail to consider protection of forest biodiversity to be part of their responsibility. The absence of an effective conservation system in GDF is therefore a significant

²⁰ Zeydanlı, U.Z., Welch, H.J., Welch, G.R., Altıntaş, M. & Domaç, A. 2005. Gap Analysis and Priority Conservation Area Selection for Mediterranean Turkey: preliminary technical report Turkish Foundation for Nature Conservation (WWF-Turkey), İstanbul, Turkey

²¹ CBD. 2011. Strategic Plan for Biodiversity 2011 – 2020 and the Aichi Targets.

²² Regulation No. 18492 on “Identification and Management of Protected Forests”, dated 13/08/84.

problem for the current PA system. Along with ineffective collaboration between GDF and GDNP, it means that PAs cannot be as effective as they should be in terms of conserving ecological processes.

Overall, a system for conserving forest biodiversity in Turkey needs to address the following challenges:

- integrating biodiversity into forest management,
- providing a regulatory framework for protected forests under the jurisdiction of GDF,
- ensuring the persistence of protected forests,
- working at stand, ecosystem and landscape scales,
- integrating current protected areas into the forest management,
- addressing principles of collaboration between GDF and GDNP, and
- defining a mechanism for participation and collaboration with other sectors.

Forest information management / inventory

Institutional aspects: As noted above, preparation of forest management plans is coordinated by GDF's Forest Management and Planning Department. However, responsibility for basic data underpinning forestry planning lies with GDF's Data Systems Department.

Baseline management activities: Turkey has a forest inventory system, which provides a basic database of information gathered during forest management planning. ENVANIS (Inventory and Statistical Database), a component of Turkey's Forest Information System (FIS) project, provides the repository for this data. ENVANIS is based on full forest cover type mapping based on 1/25,000 infrared aerial photos which are used to determine standing forest stock and growth increments. Once the inventory data is compiled, final forest cover type maps are generated and are then used to develop forest management plans. Management plans are renewed at 10- to 20-year intervals following a forest re-inventory. The inventory and database are used as a basis for reporting to FAO and is connected to the GIS recording system on forest fires.

Areas to be improved: While the FIS project (2011-2015), represents an essential data management baseline, the system does not take into account all forest functions and services. For example, it does not include biodiversity habitat conditions, carbon pools and fluxes. Under the current system, stands are classified based only on three criteria: species mix, crown closure and age classes. Circular plots, whose sizes range from 400 m² to 800 m² depending on crown cover, are distributed over the forest in 300 by 300 meter intervals. In short, the FIS project need to be improved with components for a LULUCF and biodiversity database and management system, both of which are essential for effective multiple use forest management.

Forest fire management and control

Institutional aspects: Forest fire management in Turkey is a state responsibility and is practiced by individual FEDs and sub-directorates functioning under regional directorates and under the overall supervision of GDF. Depending on the 'fire sensitivity class' of the district—which is determined by the number of fires and area burned within the district boundaries in the last twenty years—a number of fire brigades are employed. All fire brigades are equipped with necessary hand tools and machinery, including fire trucks, bulldozers, etc. Most fire management activities—such as prevention, pre-suppression, suppression and post-fire management—are carried out under the supervision of sub-directorate officers within the districts.

Baseline management activities: Currently, the principal objective of fire management organizations is to effectively control the spread of forest fires. This objective is pursued through efficient detection systems, fast initial attack and powerful suppression. Fire lookout towers across fire prone areas and video-based fire detection systems are in place in some regions, directly linked to fire command centers. Each region has been provided with sufficient resources and manpower to combat forest fires. New resources are being added and new technologies adopted as needed. For example, in 2011, the number of workers employed in fire detection and communication departments increased by 2,321. Forces are allocated to each district based on fire danger levels and area. Mobile motorcycle teams regularly check areas of high fire danger during the fire season. In addition to the resources available, a highly efficient GPS-based vehicle tracking system has been successfully implemented. Fire and fuel brakes have been widely used to break the continuity of forest fuels around high fire risk areas such as camp grounds, disposal sites, settlements, major highways and

railroads. The width of the fuel breaks ranges from 5 to 15 meters. Efforts are made to keep them as narrow as 5-7 m on average, as larger fuel breaks are very difficult to maintain, are susceptible to erosion and reduce carbon sequestration capacity. Although it is very labor intensive, the practice of clearing and occasional burning of surface fuels within 15-20 m on each side of forest stands along major highways is standard.

Areas to be improved: The baseline system of fire planning needs to be improved with an understanding of how forest ecosystems in fire-prone areas are shaped by fires, along with the land use practices and activities of people living therein; plans that need to elaborate in detail the vegetation structure and dynamics that the prevailing fire regime dictates are bound to fail. However, traditional land use practices need to be included in prevention and pre-suppression planning. Moreover, fire suppression has been carried out with little regard to the costs involved.

Grazing represents an important land use in the project area. However, grazing is mostly banned in forest lands, as a result of which the number of animals in fire-prone areas has been decreasing. These policies have been formulated on the assumption that grazing is bad; however, it is increasingly recognized that grazing plays an important role in shaping ecosystems.

In summary, current problems are exacerbated by: (i) a need of better recognition of the role that fire plays in fire-adapted ecosystems, (ii) a better participatory decision support systems including all stakeholders, (iii) an improved participation of interest groups in developing fire management plans, (iv) need of comprehensive training of personnel at all levels, (v) prevention planning is not typically included within FED fire management plans and (vi) general resistance to the use of fire as a management tool (prescribed burning).

Given the importance of these and other factors, fire management plans need to be developed with the involvement of municipalities, local communities, hunters, rural schools and other interest and target groups in the districts. Moreover, a national forest fire danger rating system needs to be developed and put in place as a decision support system to help reach an effective level of fire prevention. Fire management needs to recognize admissible (natural) fire cycles and establish fire prevention standards, ceilings and methodologies focusing on fire fuel management—including the use of prescriptive burns where deemed appropriate, rather than suppression at any cost. There is a pressing need to decrease fire hazard levels through fuel management (fire/fuel breaks, prescribed burning, masticating fuels²³, fuel removal, etc.). Fire management issues can vary greatly by location, so each district should be evaluated in its own rights and appropriate fire prevention plans developed accordingly. This calls for an improved training and decision support system reinforced by modern technologies.

Pest control

Institutional: Protection of Turkey's forests against all kinds of pests is one of GDF's main duties, one which it implements through two units, namely the Department of Forest Pest Control, as the headquarters organization and various Divisions of Forest Pest Control located in each of the 27 Regional Forestry Directorates. GDF's Department of Forest Pest Control carries out its work by integrating existing knowledge on the fight against pests with new practices being implemented worldwide.

Baseline management activities: From 2000 to 2011, pest control activities were conducted on an average of 590,000 hectares of land annually. Various mechanical, biological and biotechnical control methods are being used against organisms that cause significant losses in forests, with their population often reaching beyond limits of economic damage.

Integrated pest management (IPM), which is quite a new forestry concept in Turkey, is expected to further develop in the near future. Increasingly, the main strategy for pest control should be to use techniques and methods based on preservation of the natural structure and resistance of forests. Today, biological control methods represent approximately 35 per cent of all control activities. A bylaw issued in 2007 by the General Directorate of Forestry forbids the use of all chemicals harmful to nature.

Areas to be improved: GDF has both strengths and weaknesses as far as pest management is concerned. As a well-established institution, GDF possesses sufficient technical and administrative workforce and generally operates according to an innovative, transparent management method.

²³ Mastication is a fuel reduction and site preparation technique that involves mechanical chopping and chipping of vegetation in order to break vertical fuel continuity and reduce fuel density.

However, certain work needs to be done and possible obstacles need to be overcome in order to develop a more effective system for control and the management of forest pests in Turkey. Recognizing forest pests and controlling them accordingly is one of GDF's weak spots. This area has tended to fall behind other forestry practices and has never had a chance to develop properly. GDF employs a fairly limited number of staff with training in this field. The number of technical staff specialized in the field of controlling pests is also very limited.

FEDs have a heavy workload and staff do not always take time to focus on pest management. Branch Directorates don't have sufficient time to handle every issue, either. Some problems regarding staff policies prevent staff specialized in these areas from working in a region for a long time. The fact that forests are usually located in mountainous areas and rough terrain usually makes forestry activities more difficult to carry out. Despite being generally adequate, there are times when the forest road network falls short. These problems all affect the success of pest control, especially from the ground.

Wide areas forested with coniferous trees have become locations where entomological problems are often encountered. Especially those areas reforested with inappropriately selected species have become the most problematic. In the past, rapid forestation was considered essential; however, no real effort was shown to establish forests which are more durable and resistant against biotic and abiotic harmful factors. Technical mistakes made in locations with unfavorable growing environments and inadequate maintenance have led to emerging problematic areas today.

In recent years, GDF has been increasingly using biological methods in the control of pests. Around seventy 'laboratories' have been established to produce several species of hunter insects and these are then released to this land. However, although significant effort is being shown, the work is generally not being done in modern conditions and on a scientific basis. The main shortcomings and recommendations regarding this issue involve: (i) providing production conditions according to the location, (ii) solving the problem of qualified staff shortage, (iii) having comprehensive information on the produced species' biology, (iv) choosing the right places for release after production and (v) proper monitoring. Authorities should be further informed that practices for biological control are far more challenging than other methods and that sufficient preliminary work is necessary.

It is a fact that harmful pests in the forests in Turkey are not recognized well enough by the implementers. More work needs to be done in order to acknowledge the harmful effects of pests, their biology under different ecological conditions, and their natural enemies which put pressure on pest populations, and to produce these natural enemies artificially where biological control methods of protection does not suffice.

Fuelwood removals

Institutional: GDF's Forest Village Relations Department (ORKOY) is responsible for improving the socio-economic conditions of forest-dependent communities. ORKOY has several tools to fulfill this responsibility, including micro-credit funds.

Baseline activities: Subsidized sales of timber are permitted under the following Article 31 of Forest Law 6831, which permits below-cost fuelwood sales under the following circumstances:

- sales to households of villages whose legal territory comprises "productive" State forest lands as well as sales of industrial roundwood for domestic needs as well as for communal purposes (mosque, bridge, school etc.) of such villages;
- sales to households of those villages whose legal territory comprises "unproductive" State forest lands, and of those "towns" with less than 2,500 population whose legal territory comprises "productive" State forests as well as below-cost sales of industrial roundwood for domestic needs and for communal purposes of such villages;
- certain rights, privileges and benefits of fuelwood and industrial roundwood purchase and procurement are also accorded to those forest village inhabitants who are employed in seasonal non-tenure State forestry works and for village unions of the Central Union of Turkish Forestry Cooperatives (ORKOOP) as legal entities.

Financial support to forest-dependent communities is regulated at operational level by the latest version of "The Directive on Activities for Supporting the Development of Forest Villagers" issued by the government on June 13, 2012 (Directive no: 28322). In addition to fuelwood sales, ORKOY manages a micro-credit

program (GESIS) which issues zero-interest loans to local communities for solar energy equipment. The program, which is aimed at decreasing dependency on fuelwood, was designed with assistance from UNDP Turkey and initially implemented in the Black Sea region. ORKOY estimates an average of 3,75 m3 of yearly consumption of fuelwood by a forest household for washing water heating. The programme provides a full cost, no-interest loan, payable in 3 years in 3 equal installments, for procurement and installation of solar collectors to fulfill a family's hot water needs. These can be up to 2-3 solar panels/collectors with open or closed systems depending on the region. During 2009-2010, some 376 families drew on the funds to finance solar installations in the Black Sea region. The Government is currently in the process of launching the micro-crediting program country-wide.

Areas to be improved: Planning and introduction of micro-credits needs to be monitored, evaluated and expanded to maximize their impact on forest conservation and on forest-dependent communities. Forest villagers can be encouraged to participate through assistance in dealing with official documents. Finally, special arrangements are needed for increasing the participation of women.

Silviculture

Institutional: At national level, GDF has a Silviculture Department, which works in coordination with Silviculture Branches within Forest Regional Directorates and FEDs.

Baseline activities: The National Programme "Afforestation and Erosion Control Mobilization Action Plan has an annual budget of US\$ 20 million, targets some 10.5 million ha of forests in the whole country, that have been degraded as a result of past economic activities; large areas have a crown density of less than 10 per cent, many of which (3 million ha) are located in the Mediterranean FEDs. A key objective of the Program is to reduce illicit commercial logging, by improving enforcement and thereby facilitating natural regeneration of forests. This is being complemented by efforts to afforest 25,000 hectares of previously cleared forests. In the last decade, GDF has prepared and put into practice a number of Action Plans aimed at restoring forest lands and degraded ecosystems, increasing productivity and reducing social pressures on forests through various silvicultural techniques. OGM's Strategic Plan gives priority both to silvicultural practices aiming at conducting nature-friendly forestry activities as well as fast-growing reforestation mainly using native fast-growing conifers to the project sites. Some of these Action Plans are listed below:

- Taurus Cedar Forests Rehabilitation Action Plan (Sedir Ormanlarının Rehabilitasyonu Eylem Planı), (2005-2014),
- Degraded Oak Forests Rehabilitation Action Plan (Bozuk Meşe Alanlarının Rehabilitasyonu Eylem Planı) (2005-2014),
- Stone Pine Rehabilitation Action Plan (Fıstık Çamı Eylem Planı) (2006-2010),
- Oak Forests Rehabilitation Action Plan (Meşe Ormanlarının Rehabilitasyonu Eylem Planı) (2006-2015),
- Juniper Forests Rehabilitation Action Plan (Ardıç Ormanlarının Rehabilitasyonu Eylem Planı) (2006-2015),
- Forestry mobilization of Tending for Young Stands Action Plan (Genç Meşcereler Bakım Seferberliği Eylem Planı) (2012-2016),
- Afforestation and Erosion Control Mobilisation Action Plan (Ağaçlandırma ve Erozyon Kontrolü Seferberliği Eylem Planı) (2008-2012).

An important species for silviculture is red pine. While a significant number of research projects finished or still on-going on Turkish red pine, Taurus cedar, Stone pine, *Cupressus sempervirens*, *Laurus nobilis*, etc, yet, carbon-focused rehabilitation and thinning techniques in the stands dominated by this species have not yet been tested. This species has a number of advantages, as follows:

- Possibilities of mass production of genetically improved seeds in Turkish red pine including Taurus cedar and *Pinus nigra*.
- Easy and very successful natural regeneration techniques and widespread adaptability of them in Turkish red pine forests
- Very strong drought adapted growing characteristics of Turkish red pine

- Turkish red pine: Suitability of even-aged forest management which is easy, cost effective and widespread for working staff.
- Distributing in the lower and middle zones in addition to being easily and successfully regenerated conifer species in Mediterranean ecosystems in which forestry operations are relatively easy and cost effective
- Cost-effective and easily applicable silvicultural interventions and techniques because of distributing mostly in the lower and middle zones in addition to being easily and successfully regenerated
- The most dominant and strategically important fast-growing conifer forest tree species in Turkish forestry
- Very resistant to harsh climatic conditions and in general used its growing potential in nearly all kind of materials without losing its fast growing energy or with limited loss.

Areas to be improved: While Turkey has good success in some aspects (afforestation, fast growing plantations), silviculture activities focusing on multiple-benefit of forests with special protocols for climate change mitigation and biodiversity conservation have not been in focus so far. Experiments with promising species such as Turkish red pine have not been undertaken. Having no specific studies in GDF at national level and no demonstration implementations at FED level for such silviculture implementations focusing on climate change and biodiversity are the main areas to be improved, alongside with lack of appropriate national training and site-based implementations.

STRATEGY

Within any forest landscape, there are certain areas that have high conservation value and need to be protected. Other areas may be suffering from threats such as pests and fires; still other locations may contain economic forests where silvicultural improvements can help to enhance carbon stocks. When implemented jointly as part of single district forest plans, measures to address each of the above needs will contribute to integrity of forest within an entire forest district, and hence to its long-term resilience to natural and anthropogenic threats, and have maximum effect for biodiversity and climate.

GEF resources will help to demonstrate a model for integration of carbon emission avoidance / carbon sequestration measures and protected areas in forest landscape management over a total area of 450,000 ha. It will promote policy, regulatory and institutional changes to enable both the success of the demonstration efforts as well that of a larger-scale replication across Turkey's Mediterranean forests.

The project objective is to promote an integrated approach to management of forests in Turkey, demonstrating multiple environmental benefits in high conservation value forests in the Mediterranean forest region. More particularly, the project will demonstrate approaches to generating, measuring, reporting on and verifying carbon, biodiversity and socio-economic benefits generated through this integrated approach at five Mediterranean forest sites. It will then build on these results through the development of a forest sector NAMA covering Turkey's Mediterranean forests. Laying the foundation for leveraging and scaling up of the project's demonstration results is thus an important component of the project's strategy—one which is further made possible by a strengthened enabling environment.

Overall, GEF incremental support has been designed to address areas to be improved while building on and filling gaps in essential baseline areas in order to achieve the project objective and contribute to the long-term objective. The project includes the following three interdependent components:

- Component 1 - Policy and institutional framework for integrated forest management within landscape,
- Component 2 – Implementation of forest-based GHG mitigation and carbon sequestration tools within landscape,
- Component 3 – Strengthening protection of high conservation value forests in Mediterranean landscape.

The project operates at several geographic levels. Interactions among these levels—and thence amongst the project components—constitute an important element of the project's logic. From top down, the levels are as follows:

National level: An enhanced national-level enabling environment—including policies, regulations, capacities and institutions for integrated forest management—is the target of Component 1. Outputs implemented here are essential to improve the areas both to site-level demonstration work as well as to broader Mediterranean level replication efforts.

Mediterranean forest level: While there are several possible definitions of the area described by the term ‘Mediterranean forest region’ of Turkey, for the purposes of the project, the area is defined as an area of 9.4 million hectares in total, extending from the southwest of Turkey to Amanos Mountains in the east of the country. Map 1 shows the Mediterranean forest definition used by the project, i.e., the project area. This region is herein defined as ‘the project area’ and represents the target area for replication of the project’s approach. The primary vehicle for replication will be a Mediterranean forest sector NAMA.²⁴ The NAMA will be developed under Component 1, based on carbon-related information and inputs from Component 2 and other multiple benefit- (particularly biodiversity) related lessons and strategies developed under Component 3.

Demonstration site level: Five carefully selected demonstration sites (see **Annex F**, Site data sheets), totaling 651,921 ha, represent the geographic boundaries for Component 2 and portions of Component 3. Administratively, these areas are managed as Forest Enterprise Districts (FEDs). Given the substantial size of each FED, their ecologically driven boundaries and the fact that they are only partially forested²⁵, these pilot sites provide the project’s primary venue for demonstrating a landscape approach to managing for multiple benefits. Carbon benefits accrued under Component 2 will be measured and verified at this scale, while buffer zones and corridors for protected forests defined under Component 3 will be planned for under FED management plans. Finally, inter-sectoral coordination with productive sectors will largely play out at the level of FEDs.

The five pilot demonstration FEDs were selected based on the following criteria:

Enhanced carbon sequestration potential: FED should have red pine forests with first grade *site quality index*, growing on 30 per cent or less slope, and deciduous forests suitable for coppice management, made up of species with high growth rate and suitable for 10 years of management periods, growing on 30 per cent or less slope.

Biodiversity significance: Existence of high nature value areas in the FED, including species dependent on active conservation.

Enhancing carbon sequestration capacity via species selection in stand level: FED should have red pine forests that bear mixed stands of red pine with black pine, juniper, fir and oak.

Socio-economic practices of forest villagers: FED should include forest villages which is highly depend on the forest resources, forest labor income, non-wood forest products. IT is also desired that forest cooperatives in these villages should be open minded and ready to consider new recommendations.

Enhancing carbon sequestration capacity via afforestation: FED should have afforestation areas established at least 51 years ago, afforestation area established after 1st of January 1990 and eroded areas where erosion control studies may be conducted.

Protected forest level: Under Component 3, areas of globally significant biodiversity within the demonstration sites / FEDs will be identified as ‘protected forests’ and be subject to a more conservation-oriented management system, based on regulations developed under Component 1. These areas together cover 79,960 ha.

The project demonstration FEDs, their biodiversity values, and baseline and project carbon scenarios are described in detail in **Annex F** (Site Data Sheets). Project components and associated outputs are described in detail below. Additional details are provided in the annexes.

Component 1: Policy and institutional framework for integrated forest management within the landscape

As described in the baseline section above, Turkey’s policy and institutional framework for sustainable forest management has important shortcomings, particularly with respect to accounting for and integrating carbon and biodiversity values. Component 1 is an umbrella national component designed to strengthen Turkey’s institutional and policy framework and capacities in these areas in order to achieve important national and global benefits. Through incremental activities not covered by any baseline program, GEF will support Turkey’s ongoing efforts to put in place an enabling environment needed to conserve, and where possible enhance, carbon and biodiversity benefits generated by its forests. This component will directly

²⁴ Forest carbon markets represent additional possible vehicles for gaining verification and financial compensation for carbon benefits in particular.

²⁵ Total area with crown cover > 10% is 264,619 ha, or 40.6% of the combined demonstration site area.

support the achievement of goals laid out in, *inter alia*, Turkey's National Climate Change Action Plan (NCCAP) (2011) and Biodiversity Action Plan (2007). In thematic terms, Component 1 will address issues ranging from regulations governing the establishment of protected forests to systems for monitoring, reporting and verification (MRV) of forest carbon stocks and fluxes.

The outputs and outcomes to be achieved under this component are essential to the success of the demonstration activities being undertaken under Components 2 and 3 (see below). In addition, and perhaps more importantly for the long term, Component 1 will support a process of learning from and building on these demonstration activities to create a platform for scaled up implementation of multiple use forest management. This platform—to be realized through a combination of evolving financing mechanisms such as Nationally Appropriate Mitigation Actions (NAMAs) and voluntary and compliance carbon markets—will be designed to take full advantage of the latest opportunities being created globally to monetize the value of forest carbon in particular. By tying the carbon-related aspects of this process closely to non-carbon co-benefits—including biodiversity in particular, but also socio-economic benefits and other value-laden elements of SFM—the project will ensure that Turkey moves down a path in which all such benefits are accounted for and optimized.

Component 1 will be implemented through the outputs described below.

Output 1.1: A LULUCF unit in GDF with specialized capacities and tools to design, implement and monitor efforts to conserve and enhance Turkey's forest carbon stocks

A LULUCF unit will be established within GDF's Department of Forest Management and Planning during Year 1 of the project. The LULUCF unit will provide technical and operational guidance and support to the Department's efforts to conserve and enhance Turkey's forest carbon stocks. The unit will have a variety of roles and functions related to the GEF project, including managing a LULUCF database, developing a forest sector NAMA (see Output 1.5) and coordinating demonstration and other work taking place under the GEF (see component 2) and eventually other technical co-operation projects. Initially, the unit will consist of the following three technical staff: (i) an expert on remote sensing and GIS, (ii) an expert on forest inventory and management planning, and (iii) an expert on LULUCF's and AFOLU's GHG calculation process (as described in IPCC guidelines).

The unit will be supported during the course of the project by the Project Management Unit (PMU), with whose members they will share a common premises, and by GEF-funded short-term technical consultants. Among the tasks of the PMU members and short-term consultants will be to provide capacity building support to ensure that the relevant technical skills of the unit's staff are up to date and comprehensive. The unit will also receive technical support from some of Turkey's forest research institutes. Staff of the unit in turn will help to provide training to field-level staff under the project's demonstration components. **Annex H** provides draft terms of reference for the unit and its staff members.

Well prior to the completion of the present project, the unit's performance and adequacy of its staffing will be evaluated, particularly in light of an expected expansion of the scope of its work (see output 1.5), as well as the phasing out of GEF technical support. Based on this assessment, GDF has agreed to budget, and provide additional staffing for, the unit's continued, and potentially expanded, work.

Output 1.2: Regulatory and methodological revisions to enable accounting for multiple benefits arising from Turkey's forests

This output will enable the thematic and geographic expansion of an existing category of protected area known as "protected forest", which to date has been used for protecting areas threatened by natural disasters including avalanche, landslide and erosion. An existing regulation²⁶ governing the establishment of protected forests will be revised and updated in the following ways: (i) expansion of PA establishment criteria to include specific biodiversity and carbon considerations; (ii) a detailed methodology and protocol according to which potential new protected forests can be assessed, prioritized and established; (iii) incorporation of provisions related to permanence, integration with forest management plans, restricted uses (including extractive ones) and associated sanctions, and resolution of inter-agency conflicts, and; (iv) monitoring, assessment and other management-related protocols. These revisions—which will be discussed and agreed on through a consultation process that will include participation of forest-dependent peoples and

²⁶ Regulation No: 18492 on "Identification and Management of Protected Forests", dated on 13.08.1984.

their representatives—will be essential both to formalizing under Turkish law the protected forest status to be accorded to the approximately 80,000 ha within the project's pilot demonstration areas (see Component 3), as well as to eventual expansion and replication within other Mediterranean forest areas (see Output 1.5 below).

In addition to this support to PA system expansion, the project will support the development of methodologies for accounting for multiple benefits arising from Turkey's forests. These will take the form of detailed SFM criteria and indicators, to be developed in conjunction with work at the five pilot sites under Component 2 and subsequently replicated. Demonstrating, and where possible quantifying, these co-benefits of the new carbon-oriented approach will be important factors in encouraging its wider adoption / replication.

Output 1.3: Initial development and deployment of MRV for Turkey's Mediterranean forests

The project will support development of a system for measurement, reporting and verification (MRV) of changes in forest sector carbon. This will include a scientific methodology and protocols for measuring carbon stocks and fluxes which is tailored for Mediterranean forests. Thus, while this will ultimately be a national forest MRV, the project will develop and test the system within Turkey's Mediterranean forest region.²⁷ The MRV will be designed to allow subsequent updating and expansion throughout Turkey, as data for other forest types is gathered and fed into the centralized database.²⁸ While the Mediterranean FED has distinct bio-geographic characteristics compared to other forest regions of Turkey, these distinctions do not appear to require a separate sub-regional MRV.

A key part of the MRV will be a LULUCF database (to be established under Output 2.5), which will represent a comprehensive improvement over the current Forest Management Plans database. In addition to carbon measurements, the database and other aspects of the MRV will be designed to incorporate data on biodiversity and other benefits. Including biodiversity within the MRV system will be critical to enabling integrated forest management and decision making, e.g. when developing a forest sector NAMA through which additional protected forests would likely be identified (see Output 1.5 below).

As with other project elements, the LULUCF unit established under Output 1.1 will be closely involved with implementation of this output, thus ensuring long-term institutional support for Turkey's forest MRV. Carbon stock and flux methodologies are important for national reporting to UNFCCC, for NAMA and carbon market projects or for monitoring of carbon stock changes for application of SFM criteria. Generally, for Turkey, the methodologies recommended in the GPG-LULUCF manual—which have been accepted by UNFCCC and FAO—will be used as the basis to measure the reduction in forest degradation and increase and enhancement of carbon stocks, with some infusion of national data. This will represent a combination of Tier 1 and Tier 2 methods, as Turkey has some reliable coefficients for some of the equations which deliver more precise estimates. Since forest management plans are the most important data source in carbon calculations, incorporating the LULUCF manual into forest management plans is a vital project activity. Further details on the MRV are found in Annex K.

Output 1.4: Capacity building of national- and field-level foresters in forest biodiversity conservation and monitoring and LULUCF forest carbon monitoring and accounting

Under this output, training will be provided to staff in the LULUCF unit and to foresters on carbon monitoring and flow accounting. The training module, which will be designed as an initial activity under this output, will focus on LULUCF, carbon monitoring and related accounting. The training module will be integrated into the regular vocational training system.

The project's training component will be closely linked to a process of site-level lesson learning under Components 2 and 3. In this way, lessons learned through project implementation will be quickly and

²⁷ As noted above, for the purpose of the project, the Mediterranean region is defined as southern part of Turkey which is under the Mediterranean climate regime. The area is defined as Eastern Mediterranean (Southern Anatolian) Conifer Forest & Maquis, Southern Anatolian Montane Conifer and Deciduous Forest according to WWF ecoregions .

²⁸ This is a common approach adopted by technical assistance projects designed to help countries to implement the relevant UNFCCC decisions on LULUCF.

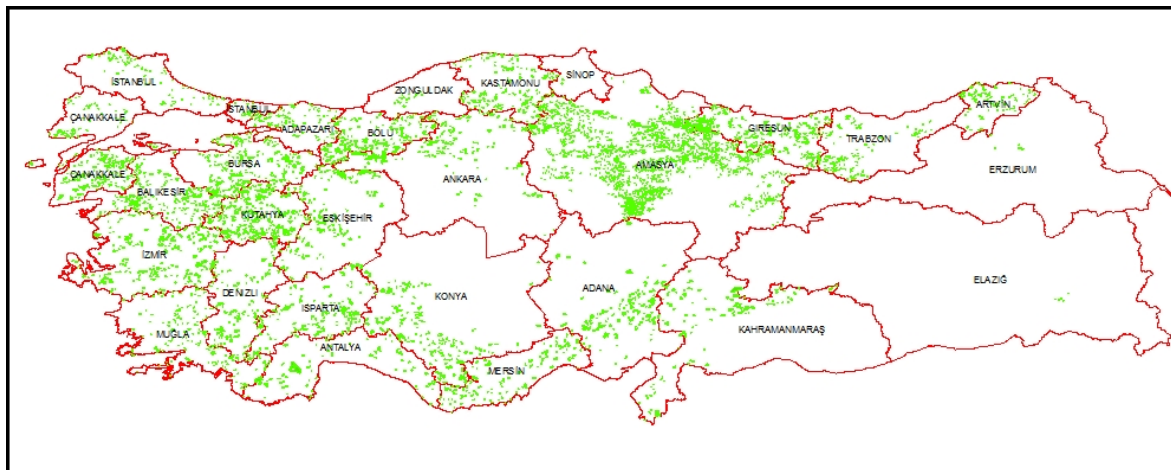
regularly incorporated into updated versions of the training programme. In addition, lessons being learned within the broader Mediterranean region will also be exchanged, with co-financing from the MENA project coordinated by GIZ. Finally, support will be provided for academic twinning arrangements with one or more international universities in order to further connect Turkey's foresters with the latest international developments in forest carbon.

Output 1.5: A Nationally Appropriate Mitigation Action (NAMA) covering the forestry sector

Turkey's national climate change action plan, which was developed in cooperation with UNDP Turkey, describes a range of potential mitigation actions to be undertaken by Turkey. Forestry-related actions include "increasing the amount of carbon sequestered in forests" and "reducing deforestation and forest damage." In order to support implementation of these objectives, the project will develop one or more Nationally Appropriate Mitigation Actions (NAMAs) within the forest sector. The technical underpinning for the forest sector NAMA(s) will arise directly from various related outputs supported by the present project, including policy and institutional development, capacity building, development of systems for MRV, demonstration activities, etc. These other outputs would form foundational elements of the NAMA and would ensure full crediting for these incremental actions.

It is expected that the protected forest strategy being piloted by the project (Output 1.2) will form an important element of the NAMA. These supporting elements will: (i) enable broad-based replication throughout Turkey's Mediterranean forest zone, (ii) demonstrate the permanence of associated carbon benefits, and (iii) provide important examples of biodiversity and other SFM co-benefits that can be achieved through NAMA implementation.

In terms of replication potential that could be triggered by forest-sector NAMA in Turkey, while it is to give a distinct numerical value for the forest carbon projects in the future, the GDF attempted to assess the areas suitable for forest carbon projects. A tentative map showing the places suitable for these purposes had already been constructed by GDF during the preliminary studies of "National Afforestation Action Plan (NAAP) 2008-2012". According to a national survey, nearly 4.2 million hectares²⁹ of degraded forest can be converted to productive forest areas through afforestation, rehabilitation and erosion control works. As a result, the map given in Figure 1 can be accepted as a tentative map showing the suitable areas for forest carbon projects.



There are four practical ways in order to increase of CO₂ uptake from the atmosphere, and release to atmosphere in the forestry sector:

- 1- Expansion of forestland areas by means of afforestation and reforestation activities - The larger the area, the higher the carbon capture;

²⁹ ASAN, Unal 2009: Report on Proposal for Turkey's Post-2012 Negotiations on Forestry. 21 pages. Prepared under the Project: Capacity Building for Climate Change Management in Turkey)

OGM 2006: Orman Varlığımız.

GDF 2007: "Afforestation and Erosion Control Mobilization Action Plan 2008-2012"

- 2- Increase of carbon absorption capacities per unit area in degraded and poorly stocked forestlands by means of rehabilitation and restoration activities, beside establishment industrial plantation with fast growing tree species and short rotation management;
- 3- Protection of forests against various hazards and damages caused by natural and human-induced effects like fire, storm fall, fungus, insects, air pollution and so on by means of proactive fire and pest management applications;
- 4- Prevention of deforestation around large cities due to immigration, and forest degradation appearing in rural areas due to over grazing and illegal cutting.

As far as increasing removals, the term ‘removal’ implies uptake of CO₂ from the atmosphere by terrestrial ecosystems such as forest, grassland, wetland and cropland. Forestlands are the most important carbon sinks because of their huge absorption capacities. There is an increasing awareness at the international level that forests are the largest terrestrial store of carbon, deforestation and forest degradation in developing countries, accounting for up to 20% of global emissions. Thus, afforestation and reforestation activities promoting carbon stocks are accepted as important mitigation actions.

Turkey has a great deal of carbon sink capacity due to its huge amount of degraded forests (OWL). According to forest inventory results published 2006, there are 10.6 million ha classified as OWL in Turkey². These areas are classified as forests by GDF, although this acceptance is contrary to FAO’s forest definition. Some 2.1 million ha of the total OWL is found within the Mediterranean region. Crown closure of an additional 2.3 million ha of forestland is between 11-40%. Thus, 11% of the total productive forests consist of low density forest cover in Turkey (OGM 2006 pp.18-19). *Pinus brutia* which is the most important fast growing tree species of the Mediterranean region is the most extensive forest type in the Mediterranean region. As a result, afforestation (on the areas open or OWL since 1961) and reforestation (on the areas open or OWL since 1990) activities are supported with a variety of artificial or natural regeneration and rehabilitation techniques on the open or OWL areas. In addition, short rotation industrial plantations established with *Pinus brutia* are helpful in order to enlarge carbon pools in forestlands.

Thus building on a range of associated project outputs, support under the present output will involve the development and dissemination of one or more specific detailed mitigation proposals for international and / or domestic financing. The NAMA is expected to focus on some or all Turkey’s Mediterranean forests. Monitoring of the NAMA will include a range of process indicators to show that actions considered important for the success of the NAMA have actually taken place. These indicators will provide information on the amount of emissions saved and on the magnitude of the co-benefits and their impact on sustainable development, as well as on the concrete implementation of the actions planned. Such indicators may be used by funders as milestones linked to the provision of different tranches of funding.

Component 2: Implementation of forest-based GHG mitigation and carbon sequestration tools within landscape

Component 2 will implement GHG mitigation and carbon stock enhancement activities at five demonstration sites within the Mediterranean forest landscape. Here the project’s incremental value rests with its support for expanded and, in some cases, innovative approaches and technologies for reforestation, fire management, tree species management, weeding and thinning cuts, and pest control, combined with a robust system for measuring, reporting and verification (MRV) of the resulting incremental carbon benefits. Permanence will be enhanced by zoning portions of these areas for conservation (see Outcome 3). The protection regimes will be flexible in order to allow for protection of the most valuable areas on the one hand, while other areas would continue to be sustainably used and monitored through the national carbon stock monitoring system. Carbon benefits would arise under each of the management regimes.

Projected annual carbon benefits associated with reduced emissions at each of the five sites arising from various Component 2 outputs are presented in **Table 4** below (see **Annex P** for a spreadsheet containing detailed calculations):³⁰

Table 4: Projected annual carbon benefits associated with reduced emissions at each of the five sites

³⁰ For details regarding the methodology underlying these calculations, see Annex K, together with an accompanying Excel file. For 20-year benefit estimates, as well as cost effectiveness calculations, see Section B.6 below

	CO2-eq/y reduced or avoided			
	Reduced fuel-wood removal	reduced impact of pests	reduced fires	TOTAL
KÖYCEGİZ	539.51	3,212.76	81.94	3,834.21
ANDIRIN	6,714.98	1,774.05	21.00	8,510.04
GÜLNAR	268.38	17,822.27	1,465.71	19,556.35
GAZIPASA	915.01	4,958.90	46.27	5,920.18
POS	4,599.95	2,419.73	31.00	7,050.68
Total	13,037.83	30,187.71	1,645.92	44,871.46

Table 5 below shows annual carbon benefits associated with enhanced carbon sequestration arising from various Component 2 outputs. The specifics of activities at each site, as well as calculation of carbon benefits and underlying assumptions are described in detail in Site Data Sheets in **Annex F** and carbon calculations in **Annex P**.

Table 5: Annual carbon benefits associated with enhanced carbon sequestration

	Carbon (CO2-eq/y) sequestered improved silviculture
KÖYCEGİZ	3,368.87
ANDIRIN	2,846.08
GÜLNAR	1,455.27
GAZIPASA	2,202.65
POS	1,688.17
Total	11,561.04

Output 2.1: Integrated fire management systems at FED level, emphasizing fuel management, consisting of (i) a fire management information system (wildfire hazard and risk analysis; fire danger rating and early warning), (ii) fire prevention planning involving local communities and the general public, and (iii) decision support for wildfire preparedness with streamlined collaboration between responsible authorities (forest department, and fire and emergency services)

Baseline efforts at forest fire management will be built upon in order to reduce the impacts and carbon emissions from forest fires in a sustainable and ecologically sound manner. Activities under this output may be grouped into four categories. First, *mitigation* will be enhanced through fuel treatment and reduction efforts to be implemented on priority forested lands—the latter identified based on assessed hazard levels. Second, the project will support *prevention*, including burn restrictions, closures and bans linked to fire danger levels. Public awareness campaigns will form an important element of the fire prevention strategy. Third, *preparedness* will be enhanced through support for training of fire management and suppression personnel and through modifications of ignition sources and fuels that act as ignition receptors. Finally, *fire suppression* efforts will be rationalized through enhanced training and coordination, as well as through the development of standard operating procedures and agreed upon policies and responsibilities. Integrated fire management will thus be based on fire danger levels (having identified natural cycles and fuel management targets), values at risk and resources available. In addition to the above four thematic areas of activity, two cross-cutting actions are foreseen. First, Annual Wildfire Operating Plans (AWOP) will be developed for the pilot districts. These will serve as the guiding documents for resource availability, resource mobilization, special resource concerns and training. The AWOPs will be updated annually. Second, a set of maps will be developed covering aspects such as fire occurrence (locations, dates, times, size of fires), thematic aspects (hydrology, roads, fire crew centers and vegetation). These will serve as inputs to overall wildfire hazard rating maps, based on a wildfire hazard index that will categorize areas based on risk (very low, low, moderate, high and extreme). These latter maps will be used to identify sub-divisions that are in more hazardous areas. In addition to the FEDs, this output will work closely with the International Fire Training Center, which was recently established in Antalya.

Output 2.2: Enhanced silvicultural efforts—including carbon-focused thinning (5,000 ha), forest rehabilitation to increase crown cover in selected areas from 10-15% to 50% (3,000 ha).

A combination of silvicultural and forest rehabilitation efforts will receive incremental GEF support under this output aimed primarily at increasing their carbon benefits. In the area of silviculture, the project will build upon baseline efforts being undertaken through Turkey's Action Plan for Tending Activities of Young Stands. A variety of silvicultural efforts will be supported, including: (i) regeneration tending (thinning out and/or replacement planting), (ii) tending in plantations (cultural tending), (iii) release cutting, (iv) pruning³¹, (v) conversion of coppice forests to high forests, and (vi) initial thinning interventions. GEF support will enable the expansion of thinning operations in demonstration FEDs across an additional 5,000 ha, mainly of *Pinus brutia* forests. Replication potential for thinning in the Mediterranean region is at least 577,700 ha.

In the area of forest rehabilitation, carbon-focused programmes will be undertaken in: (i) degraded Turkish red pine areas, (ii) Turkish red pine with Anatolian black pine forest areas in the lower and middle zones in all selected FEDs and (iii) in other forest ecosystems in the middle and upper zones, including degraded Taurus cedar forests, mixed forests of Turkish red pine, Anatolian black pine and Oak species, Taurus fir, Beech and Oak species, and other degraded forests found in some districts, particularly in Andırın FED. GEF support will enable the expansion of rehabilitation operations in demonstration FEDs across an additional 3,000 ha. Replication potential for forest rehabilitation in the Mediterranean region is estimated to be at least 800,000 ha.

The following will be among the key aspects of the GEF-supported rehabilitation effort: successfully establishing fire-resistant reforested areas with mixed conifer and broadleaved tree species in the project area in line with microclimatic conditions;

- areas to be selected will mainly be in less productive ecosystems (unproductive coppice stands, unproductive high forests, maquis or mixed ecosystems with *Pinus brutia* mainly) in order to achieve benefits in a short time in a cost-effective manner;
- areas with suitable soil conditions will be selected where it is possible to create a minimum 50% crown cover in a 10-year period;
- biological diversity will be taken into account at each stage of implementation, e.g., species selection, need for corridors, etc.;
- favorable geographic and ecological characteristics will be identified during feasibility studies;
- a multi-disciplinary team will be involved in implementation in order to reach the sought-after objectives on time, and;
- aftercare tending facilities should be conducted regularly at each site for at least three to four years.

In addition to the thinning and forest rehabilitation efforts described above, the project will support the implementation of a set of intensified planting and harvesting arrangements across 1,200 ha, which will help to offset timber production losses associated with the establishment of protected areas (see Component 3 below). These activities will be implemented in part in order to avoid potential leakage associated with the establishment of protected areas in Component 3.³²

Output 2.3: Micro-crediting program to support access to solar heating and alternative heating technologies / implementaion of more efficient insulation technics in pilot areas as a means to avoid illicit cutting of native forests)

³¹ In research conducted in the Western Mediterranean Region on Turkish red pine, the positive effect of pruning was estimated at more than 44% increase for short size, 45% for medium size, and 48% for long size log on. High dosage of pruning (3/4 of the total height) was effective on dbh and volume increment but these positive effect disappeared after pruning in 4 to 6 years depending on site index (Erkan, 2010, p. iv, 58-59). In addition, pruning in Turkish red pine forests helps in forest fire management—reducing negative impacts such as area burned, the rate of moving ahead, size affected, etc. It also provides seasonal employment as well as fuelwood for local villagers from small size wood materials.

³² Potential carbon sequestration benefits in these areas are not currently included in the project's calculations but may be considered during the course of implementation.

Through expansion of an existing programme that has been operating successfully in the Black Sea region, interest-free loans will be provided to local communities at pilot sites for solar-water heaters and other alternative heating technologies. This will be implemented as part of the country-wide micro-credit program for solar energy coordinated by the Directorate of Forest Village Relations of General Directorate of Forestry within the Ministry of Forestry and Water Affairs. The program was initially designed with assistance from UNDP, and tested in the Black Sea region. It provides a full cost no-interest loan, payable in three years in three equal installments, for procurement and installation of solar collectors to fulfill a family's hot water needs. These can be up to 2-3 solar panels/collectors with open or closed systems depending on the region. During 2009-2010 some 376 families drew on the funds to finance installations in the Black Sea region. The Government is now in the process of launching the micro-crediting program country-wide (under the auspices of the Ministry of Forestry and Water Affairs). In the Mediterranean region, these funds have been reserved as co-financing for the GEF project. The disbursement and collection system is in place, maintained by Government. Project partners will assist with the deployment of the scheme through assistance in: marketing of the scheme to local communities; assistance to villagers in feasibility assessments and application process; guidance on installation and use of panels; and monitoring of contractual arrangements. It will be highlighted that the microcredit fund has been provided by the GDF in all promotional and guidance documents for the microcredit scheme.

According to data from GDF's Forest Village Relations Department (ORKOY), the use of solar panels will decrease annual fuelwood use per family by 3.75 m³. Across all five sites, illicit logging currently has an impact of 13,500 m³. Much of the consumption is for water heating and cooking. The project will address both needs through this microcredit scheme. Ultimately, the project will satisfy the basic energy needs of the targeted families for domestic water heating and cooking, thus they will not need to resort to any illicit fuel wood cutting. The capitalization of the microcredit fund will come from the Government. The management and distribution of these microcredits will be conducted according to the relevant regulations of GDF. The project will implement monitoring of contractual arrangements: each transaction will be based on a contract between the Fund and the client, stipulate committing of the recipient to refrain from fuel wood cutting. The project will help set up systems for ensuring compliance. Therefore, there is no expected displacement resulting from implementation of the project. Up to 1,100 households are expected to benefit from this scheme, saving 9,200 cubic meters of native forest from logging. The specifics of the scheme are further reflected in Annex M. The calculations of carbon benefits are presented in respective Site Data Sheets in Annex F.

Output 2.4: Integrated pest management system for forest management including establishment of two pest biological control and early warning centers in the Mediterranean region equipped with technologies for field observations and early problem identification as well as a laboratory dedicated to research and training on natural enemies

This output will demonstrate approaches to gaining carbon and SFM benefits through enhanced and integrated pest management investments at the pilot demonstration sites. It will begin with a comprehensive study of existing forest pests at the sites, including species, areas covered, biology and natural enemies. This will include an examination of the written records of the areas damaged by the economically harmful species inhabiting these forests in recent years on a year-on-year basis, as well as identifying and mapping the risk areas according to these records, establishing the ecological and socio-cultural reasons behind the harm caused by species in these areas. The activities mentioned above will be conducted by a team consisting of local and international consultants with sufficient expertise in this field. These studies involve both an instruction and a research aspect. They are activities to be conducted mutually by a technical staff to be employed in regional forest management, a technical staff with expertise in forest pests, researchers and academic staff. The significant proactive precautions as a whole have been considered on a sub-project scale. To improve monitoring, pest reporting forms will be updated, a pest registration system will be established; these will form important elements of an early-warning system for pest control to be established. Integrated control programs will be established for management of known pests, as well as newly identified ones. Four different methods will be used in early warning systems which will be simultaneously implemented in order to achieve accurate results. These methods will benefit from examining the pest's biology, observing the plant phenology, pest's threshold of growth, thermal constant and its relation with heat. Since the biology of pests differs regionally, studies will be carried out under different ecological conditions and especially at different altitudes. It is important to know at which time intervals they take-off, for a successful early-warning system. For this purpose, pheromone traps will be used. Furthermore, the growing process of the tree during pests' flying period will be examined, the relationship between their flying time and the tree's

phenological periods will be determined, and finally the results obtained will be used for implementation on greater scale. In addition, the meteorology stations of GDF for preventing forest fires will be used to feed data for early-warning system against pests.

Finally, two laboratories will be established in order to produce natural enemies for biological control and a training department will be created for staff working in this field. Two pest laboratories will be established in order to produce natural enemies for biological control and a training department will be created for staff working in this field. The laboratories will be established by the GDF as co-financing activity. It is planned that one of the laboratories will be established in Eastern Mediterranean Forest Research Institute, in Mersin Regional Directorate, while the other one will be established in Western Mediterranean Forest Research Institute, in Antalya Regional Directorate. Both laboratories will be run by the GDF with staff assigned for administrative and technical issues. Assigned staff will be trained and established laboratories will be equipped by the GEF support.

The works to be undertaken in the laboratories are identifying major pests, hunters and parasites, and conducting research to produce beneficial agents. Once the species, i.e. beneficial agents, will be produced in the laboratories, they will be released in the pre-determined locations affected by pests. Locations will be closely monitored to evaluate the impacts of species produced in the laboratories by the GDF staff. Main steps to establish and run the laboratories are listed below:

- Construction of the laboratories
- Equipping of the laboratories
- Undertaking survey studies on pests and beneficial agents/insects
- Undertaking efficacy studies and production of beneficial agents
- Releasing and monitoring beneficial agents
- Training of the staff – on going.

Main units of the laboratories are offices, a preliminary laboratory, production units (air conditioning cabinets and rooms), food unit (plants, wood, insects as food), a diagnosis and research laboratory, a training hall, various counters and shelves and a storage room. Some basic equipments to be installed are listed below:

- Computers: To be used in the automation and monitoring of production rooms, and in offices.
- Projection devices: To be used in the training presentations for the implementers.
- Microscopes: To be used in the identification of and research on beneficial and harmful agents/ pest.
- Stereo microscopes: To be used in the identification of and research on beneficial and harmful insects.
- Power generators: Necessary for the uninterrupted running of production in case of a power cut.
- Production rooms, equipment and chemical materials: To produce beneficial agents.
- Air-conditioning system for production rooms
- Devices for heating, cooling and lighting

Output 2.5: Carbon stock and stock change measurements taken at pre-selected monitoring sites within the pilot areas using the methodology designed in Output 1.3. Carbon protocols completed before, during and after the implementation of enhancement and mitigation efforts (Outputs 2.1-2.4). Data transferred to the centralized LULUCF-Forest Carbon data-base (Output 1.4). Precision of carbon benefits generated by the project is improved each time the measurements are taken.

Under this output, carbon stock and flux measurements will be taken at pre-selected monitoring sites within the demonstration areas and at protected areas, using the methodology presented in **Annex K**. The system will be run three times: in the beginning, in the middle and at the end of the project, to enable accurate reporting on carbon benefits to the GEF. Data will be transferred to the centralized LULUCF data-base

(Output 1.4). The precision of estimates of carbon benefits being produced by the project will be improved each time measurements are taken. The results of this activity will be used to strengthen and validate the MRV system established under Output 1.3.

The standard forms and the formula serial of the LULUCF methods will be used in the project, a mix of Tier 1 and Tier 2. Land use classes and transition among the land use forms will be defined. Carbon stock and stock changes (carbon fluxes) in the forest lands will then be calculated using the methodology specified in **Annex K**.

Remote sensing and satellite images will be used to measure, verify and report on carbon emissions before and after completion of Output 2.1. Coefficients specific to pilot sites and equations for LULUCF Good Practice Guidance (LULUCF GPG) at each pilot site will be measured during the implementation of the project through data to be collected via ground observations and measurements related to burned area for obtaining a sound and reliable result. Collected data on type of forest fire and biomass loss obtained from ground observations and measurements undertaken at sample sites will be used to run remote sensing and satellite images.

Additional details regarding project-level MRV are provided in **Annex K**.

Component 3: Strengthening protection of key conservation value forests in Mediterranean landscape

Following the adoption of ‘Criteria and Indicators for Sustainable Forestry’, GDF has carried out activities to protect sites important for biodiversity, as well as to protect important species of fauna and flora. These initially sporadic and ad-hoc activities have evolved to more systematic conservation initiatives after the first attempt to integrate biodiversity into forest management planning within the GEF-funded ‘Biodiversity Conservation and Natural Resource Management Project’. However, the current system has many gaps and remains under development.

Component 3 will therefore focus on improving the conservation system within GDF to ensure effective conservation of forest biodiversity closely tied to broader SFM objectives. The component will provide technical support and know-how to enable GDF to build a robust conservation system linked to generation of a range of SFM benefits, including global carbon and biodiversity benefits.

Within each of five pilot demonstration sites—the same areas as in Component 2—one or more areas will be designated as protected forest (Output 3.1) under a new regulation to be developed under Component 1 (Output 1.2). The exact locations of these areas will be decided based on a biodiversity assessment, building on desk assessments undertaken during the PPG. Within the newly protected forest areas, which will correspond to IUCN Category IV or VI, a special management system, including logging restrictions, will be put in place; carbon benefits associated with the reduction in logging on these lands are estimated at 1,284,900 tCO₂e over a 20-year period. GDF capacities to manage these newly protected forests and to ensure their integration into the broader production landscape will be enhanced.

Further in line with a landscape-level approach, buffer zones and corridors (Output 3.2) will be identified to support the sustainability of both existing PAs and newly protected forests. These mechanisms will be developed and managed through inter-sectoral coordination efforts bringing together key sectors, including tourism, agriculture, energy production and mining. Management efforts, including any needed rehabilitation efforts identified under Output 3.1, will be integrated within the context of broader landscape-level forest management through revised management plans. This will be essential to incorporating key changes—such as newly protected forests, buffer zones and corridors and other site-level innovations introduced by the project—into long-term management efforts.

Partnerships for ecotourism and non-wood forest products (NWFPs) (Output 3.3) will be established among local forest directorates, local communities, community-based organizations and NGOs. Together, these outputs will help to embed site-level conservation efforts among key stakeholders and within broader land use practices.

A common thread connecting Outputs 3.1-3.3 will be a robust effort to capture key lessons learned at pilot sites. These lessons will feed into thematic assessments aimed at identifying replication opportunities within Turkey’s broader Mediterranean forest region. These thematic assessments, in turn, will constitute the biodiversity-related elements of the Mediterranean-level forest NAMA being developed under Output 1.5.

Additional details regarding specific outputs under Component 3 are provided below.

Output 3.1 High nature value forests covering 79,960 ha in the five targeted forest districts are protected

Under this output, and following procedures to be specified in regulations developed under output 1.2, one or more high-nature value forest areas will be identified and protected within each of the project's five demonstration areas. These will include areas under-represented within the national PA system. The combined land area to be protected in this way will total 79,960 ha. These areas will see important reductions in logging (including no logging areas) compared with baseline management plans, and biodiversity-friendly management measures will be developed and put in place. More specifically, the output will: (i) carry out detailed biodiversity assessments to identify priority biodiversity areas within the five pilot sites; (ii) prepare the required regulatory documentation for the new areas; (iii) develop conservation plans, including targets and biodiversity monitoring strategies for the areas, and include related changes into FED management plans (see also Output 3.2); (iv) strengthen site-level capacities for protected forest management, including training in monitoring of biodiversity, ecology, and conservation issues, as well as features of priority species at their sites; (v) support initial implementation of conservation plans, including habitat rehabilitation; (vi) capture lessons learned and identify target replication sites under a Mediterranean forest NAMA.

As part of a landscape-level approach, the location and status of two existing protected areas (see the METTs for these sites attached in **Annex G**) will be taken into account throughout this process, i.e. new protection forest areas will be designed and located, *inter alia*, to complement and enhance the sustainability and conservation effectiveness of these areas.

Output 3.2 Buffer zones and corridors embedding protected areas and protected forests within the wider production landscape

In order to ensure the effective integration of newly protected forests into the broader landscape, GEF funding will support adjustment of the spatial plans of districts surrounding pilot sites to incorporate conservation restrictions related to operation of large-commercial enterprises, with a view to establishing effective buffer zones and to enhance the functional connectivity of forests in high nature value areas. Landscape-level planning will also identify the relationship of forests with other sectors and land use practices to support sustainable use of forests, conservation of forest biodiversity and more effective multi-functioning planning. To this end, a further detailed scoping and matching of instruments and sites—together with capacity building and stakeholder participation in decision-making (e.g. representatives of other sectors including the private sector, local forest-dependent people, etc.)—will be key aspects of the landscape scale planning to be fostered under the full project. Specific activities will include: (i) the location and size of buffer zones and corridors will be identified, mapped and agreed with local authorities; (ii) statutory documents to enable the approval of the buffer zones and corridors will be adopted; and (iii) local authorities will revise their land use plans to take note of the newly established buffer zones and corridors. The total estimated area of newly established buffer zones and corridors is approximately 56,000 ha.

The many site-level changes in management approach being engendered by the project need to be integrated into site-level FED management plans in order to ensure their continuation and sustainability. Innovations related to carbon-related MRV (Output 2.5), protected forest establishment and management (Output 3.1), buffer zone and corridor management (Output 3.2) and NWFP and ecotourism approaches (Output 3.3) will all need to be integrated within management plans. The approach towards doing so will be in accordance with the existing forest management planning timetable. Thus, in some cases ongoing management plans will be amended, while in others they will be fully updated, with GEF incremental support and Government cofinancing. Local communities will be engaged throughout the management plan revision process. This will be particularly important with respect to new conservation measures to be implemented under output 3.1 and codified in the plans. Here, efforts will be made to ensure the engagement of communities in the upkeep, surveillance and conservation of protected forests and to incorporate this into the new management plans.

Finally, as noted under Output 3.1, the project will support the replication of the protected forest / buffer zone / corridor approach throughout Turkey's Mediterranean forest region, in association with forest carbon-centered efforts to be promoted under a Mediterranean forest sector NAMA. This will include, under the present output:

- Identification of important forest biodiversity areas in line with the existing national gap analysis program standards,
- Spatial socio-economic analysis to interconnect biodiversity conservation, ecosystem services, threats and opportunities,
- Spatial interconnection of carbon benefit and biodiversity conservation,.
- Spatial identification of climate change deduced risks to ensure carbon benefit and conservation of important forest biodiversity areas

Output 3.3: Site-level partnerships for ecotourism and NWFP management established

Under this output, partnerships will be established at the level of pilot sites to empower local communities to take advantage of local NWFP and/or ecotourism potential. Co-financing from the Forest-Village Relations Department of GDF will be provided to increase the impact of such initiatives.

In the area of NWFPs, the project will support and broaden ongoing efforts of GDF's Department of Non-wood Forest Products and Services (established in July 2011) to encourage and organize the coordinated cultivation/management of locally-appropriate NWFPs. Support will be provided to market and value chain analysis of selected products in each of the five pilot sites. Probable NWFPs to be promoted at each of the pilot sites are presented in **Table 6**.

Table 6: Probable NWFPs to be promoted at project demonstration sites

State Forest Enterprise	Non-wood forest product
Pos	Wild mushroom, thyme, laurel (sweet bay)
Gazipaşa	Myrtle, rockrose, sage, laurel (sweet bay)
Andırın	Thyme, laurel (sweet bay)
Gülner	Rockrose, thyme
Köyceğiz	Laurel (sweet bay), thyme

In the area of ecotourism, pilot areas considered to have substantial potential include Pos FDE, given the existing Aladağlar National Park, and Köyceğiz FDE, due to the endemic Oriental Sweetgum forest. Support will therefore target these sites and will include training and certification of ecotourism guiding, guidance to improve infrastructure, support for production of publicity materials and advertisement.

With respect to both NWFP and ecotourism development, areas to be improved for innovation will be analysed and local partnerships will be supported and guided to encourage innovations on NWFP and ecotourism. NWFP management and eco-tourism will be incorporated into site-level forest management plans (see Output 3.2), in order to ensure institutionalization of the process within GDF. Finally, as with Outputs 3.1 and 3.2, lessons learned under this output will be captured and fed into the development of a Mediterranean forest sector NAMA.

Further details on this Output are presented in **Annex J**.

Table 7: Baseline and alternative scenarios, by component and output

Baseline (business-as-usual) scenario	Alternative GEF scenario
<i>Policy and institutional framework for integrated forest management within landscape</i>	
<ul style="list-style-type: none"> • LULUCF Unit: There is no sense of urgency to establish a LULUCF unit. If one were to be established, it is likely that staff would not be well trained or knowledgeable regarding the technical areas in question. • Accounting for multiple benefits of forests: Gradual progress related to forest carbon would likely be made based on targets set in the NCCAP. Regulations covering protected forests would continue to cover avalanches and landslides rather 	<ul style="list-style-type: none"> • LULUCF Unit: An adequately staff and funded LULUCF unit with technical capacities to drive forward forest carbon efforts in the country • Accounting for multiple benefits of forests: Detailed SFM criteria and indicators for multiple benefits encourage and support the development of a carbon-oriented approach that takes full account of biodiversity and other co-benefits • Monitoring, reporting and verification systems: Initial development and

Baseline (business-as-usual) scenario	Alternative GEF scenario
<p>than biodiversity.</p> <ul style="list-style-type: none"> Monitoring, reporting and verification systems: ENVANIS database does not include biodiversity, habitat conditions, carbon pools or fluxes. Human capacities for multiple-benefit-based management: Lack of adequately trained staff in key areas Development of a forest sector NAMA : Turkey would face serious difficulties in developing and implementing a forest sector NAMA due to the lack of human and policy infrastructure, capacities and site-level examples. No, or only a small-scale, forest sector NAMA would be expected to emerge during the project period 	<p>deployment of a system for MRV of forest carbon changes, together with associated co-benefits, in the Mediterranean region</p> <ul style="list-style-type: none"> Human capacities for multiple-benefit-based management: Staff of LULUCF unit and foresters trained on LULUCF, carbon monitoring and related accounting, as well as biodiversity monitoring. Development of a forest sector NAMA: Turkey has a fully developed NAMA covering 2-4 million ha of Mediterranean forest, with field-tested methodologies and approaches to achieving carbon benefits along with co-benefits, along with clear indications of cost effectiveness.
<i>Implementation of forest-based GHG mitigation and carbon sequestration tools within landscape</i>	
<ul style="list-style-type: none"> Fire management systems: Continued emphasis on, and success in, fire suppression, with shortcomings related to training, participation, prevention planning, and understanding of fire's ecological role. Carbon losses due to fire at pilot sites = 3,628 tCO₂e/y Carbon-oriented Silvicultural techniques: No demonstrations of either carbon-focused or biodiversity-focused silviculture programmes. Fuelwood removals: Continuing high levels of fuelwood removals, including for household heating. Emissions due to fuelwood removals is estimated as 18,774 tCO₂e/y Pest management: Ongoing but slow introduction of biological control methods due to lack of trained staff and poorly equipped laboratories. Carbon losses due to pests at project sites is 45,281 tCO₂e/y Site-level carbon stock and flux measurements : Limited experience with site-level carbon stock and flux calculation methods 	<ul style="list-style-type: none"> Fire management systems: Integrated fire management systems have been demonstrated, covering mitigation, prevention, preparedness and fire suppression. Projected carbon losses due to fire at pilot sites = 1,983 tCO₂0/y Carbon-oriented Silvicultural techniques: Suitable techniques for carbon- and biodiversity-focused silviculture techniques demonstrated, including field-based measurements of growth and cost effectiveness. Projected carbon gains from silviculture at pilot sites = 11,561 tCO₂e/y Fuelwood removals: 1,100 families have received solar hot water heaters and / or related solar equipment, leading to declines in emissions due to projected fuelwood removals at project demonstration sites of 13,038 tCO₂e/y Pest management: Two well equipped laboratories, together with well trained staff. Projected carbon losses due to pests at project sites is 15,094 tCO₂e/y Site-level carbon stock and flux measurements: Turkey has experience with taking carbon stock and flux measurements, including methods related to remote sensing and satellite imagery, with results used to strengthen and validate its MRV system
<i>Protection of high conservation value forests in Mediterranean landscape</i>	
<ul style="list-style-type: none"> Protection of high nature value forests: Many high nature value forests remain unprotected and subject to standard logging regimes Embedding protected areas and protected 	<ul style="list-style-type: none"> Protection of high nature value forests: Use of regulatory tool for protection of high nature value forest is demonstrated at multiple locations within the five demonstration sites, totaling 79,960 ha. New areas, together with existing PAs, see important increases in management

Baseline (business-as-usual) scenario	Alternative GEF scenario
<p>forests within landscape: Protected forest areas are increasingly isolated as sometimes high-impact development take place in their vicinity. No use of buffer zones or corridors.</p> <ul style="list-style-type: none"> Ecotourism and nwfp development in Mediterranean forests: Ecotourism development has not achieved its potential, particularly given very high levels of tourist visitation in the region. NWFP collection remains unorganized, unmanaged and ad hoc. 	<p>effectiveness</p> <ul style="list-style-type: none"> Embedding protected areas and protected forests within landscape: Sustainability of newly protected forests, as well as two existing PAs, is enhanced by biodiversity-friendly planning and management, including establishment of buffer zones and corridors within FEDs Ecotourism and nwfp development in Mediterranean forests: Expanded development of ecotourism and NWFPs increases incomes among some forest-dependent people, while providing useful demonstration of market-oriented approaches to multiple forest use.

The above-described alternative scenario funded by GEF and cofinancing resources is expected to result in key modifications to the baseline scenario that will generate global environmental benefits. The project will generate multiple global environmental benefits in the areas of biodiversity conservation, climate change mitigation, sustainable land management, and sustainable forest management. Key global benefits are described below.

Climate Change focal area benefits:

The climate change benefits will include the implementation of emission mitigation and carbon sequestration practices in 5 target FEDs, thereby leading to emissions reductions of 44,871.46 tCO₂-eq/y and increased sequestration equivalent to 11,561.04 tCO₂-eq/y. In addition of net carbon benefit associated with new conservation areas of 64,186 tCO₂-eq/y, the total annual carbon benefit of the project is 120,619.06 tCO₂-eq/y. Over lifetime (a 10-year perspective for renewable energy equipment and 20-year perspective for other LULUCF activities), this equates to an emissions reduction/sequestration dividend of 2,282,002.95 tCO₂-eq. The potential area for replication of the ecosystem-based mitigation activities piloted by the project, covers over 1.6 million ha of forests, and if realized would result in emissions reductions of over one million tCO₂/y.

Carbon monitoring, reporting and verification (MRV) system for forestry sector will be established at national scale (Output 1.3.). MRV system will be supported with a centralized LULUCF database and carbon stock and stock change measurements in Mediterranean forests of Turkey at FED scale (Output 2.5.). MRV system will enable Turkey to improve existing capacity not only for reporting to UNFCCC but also for preparing landscape level forest management plans with special criteria and indicators for climate change. MRV system will be prepared in line with LULUCF Good Practice Guideline (GPG) with new standards to Mediterranean forests.

Nationally Appropriate Mitigation Actions (NAMA) for forestry sector will also be prepared during this project in a way that GDF will increase existing knowledge and experience for NAMA wise forestry plans and programmes. During the preparation of NAMA, demonstration projects to avoid emissions and enhance stocks will be implemented and registered to carbon markets.

The mitigation measures proposed are cost effective. The project's total incremental investment in carbon mitigation and sequestration under Component 2 is US\$ 17,857,670. Taking a total lifetime approach (for LULUCF - 20 years as accepted by GEF, which is also the most conservative life-span adopted by voluntary carbon markets for this type of project; 10-years for the lifetime of the renewable (solar) energy equipment), the total carbon benefit of the project is 2,282,002.95 tCO₂-eq. Thus, the estimated per tonne cost is equal to US\$7.82/tCO₂-eq. This is comparable with the average cost of other low-cost mitigation approaches that could otherwise be applied in Turkey, and is well below the IPCC recognized ceiling of US\$20/tCO₂-eq for low-cost technologies. Part of the project approach rests with support to a micro-crediting facility that would provide access to rural villagers to solar heating technologies and thereby deter them from logging. This micro-credit facility (fitting with CCM-3) will be 100% co-financed by the government, but is highly relevant for the project success. This is part of the cost-effectiveness strategy, since in addition to direct savings of carbon from logging, the reduction in the frequency of visits of villagers to forests for wood collection will help to reduce the frequency of fires, and hence further avoid carbon emissions. The cost-effectiveness of the pest management activities is an estimated \$5.03 per tCO₂.³³ In addition, if the cost of

³³ Based on a total budgeted cost of \$3.04 million and predicted carbon benefits of 603,820 tonnes.

lost biodiversity and lost overall ecosystem resilience of these forests damaged by pests were factored into the calculation of cost-effectiveness, proactive pest management as proposed by the GEF project, would show up as even more cost effective.

Biodiversity focal area benefits:

The global biodiversity benefits derive from an improvement in the forest management system according to conservation status of endemic flora and fauna within the Mediterranean forests, as a result of threat reduction, expansion of the Mediterranean protected forests by 79,960 ha, improved management effectiveness [measured through the GEF METT scorecard] and better integration of existing protected areas management with the management of production activities in adjacent landscapes. This management innovation is potentially replicable over an area of 6.36 million ha

Management effectiveness of two existing protected areas increased by min. 20 % (35 to 40 for Aladağlar and 26 to 40 for Kartal Lake), as measured by METT scores.

Sustainable Forest Management benefits:

Turkey's forests have been managed according to ecosystem based multi-functional management plans. Functions for each forests units in the forest management plans are identified according to Sustainable Forest Management (SFM) Criteria and Indicators (C&I). The project will improve Turkey's SFM C&I set for multi-benefit of climate change mitigation and biodiversity conservation. While desktop studies and meetings for this aim will be undertaken at national and international level in participatory way, hands-on trainings and demonstration activities at local level will be implemented.

Socioeconomic benefits, including gender dimensions:

Forest-edge communities in the Mediterranean forest landscapes have traditionally been heavily dependent on forest resources for their livelihoods. These communities are amongst the poorest in Turkey. They have the lowest national income and worst access to services such as health and education. The region has a high rate of out-migration as a consequence. The project will benefit these communities by: (1) developing a mechanism for sharing the revenues from the sale of forest credits in future carbon markets with local communities, (2) improving the skills of forest field workers, the majority of whom come from the poor local communities, (3) providing wider access to solar energy replacing destructive fuel cuts, through a wide-scale micro-crediting mechanism (this will be financed by the Government; the project will assist the Government with marketing of the scheme).

Forest-dependent communities (around seven million people in Turkey, 87,985 people in five pilot FEDs) living in and/or around any protected forest will participate in the management planning process and will receive different types of benefits, i.e. training, knowledge, easy access to micro-credit programmes for solar heaters, NWFPs and ecotourism development. At least 2,000 women and 3,000 men will benefit directly from the project activities (see further details in the text). All lessons learned from five pilot FEDs will be widely disseminated among the seven million forest villagers through GDF.

The last census showed that while most migrants are men, there is a disproportionately high female population in forest villages. Women are increasingly acting as household heads, thereby gradually changing traditional gender roles. Women obtain more benefits from the forest than men and appear to attach greater value to it; furthermore, women are much more involved in the decision-making process at the household and village level. It is critical that women play an equal role in the decision-making process, that is, they are equally treated in both the planning and management of natural resources so that they can determine their own future. This is important not just from a gender or governance perspective but also from a conservation perspective when one considers that women play an important role in the management of biodiversity and in rural circumstances women often have a high dependency on biodiversity and other natural resources for their livelihood security and its sustainable management is of real and practical concern to them.

The project is specifically designed to support the access to solar collectors through the micro-crediting scheme, which – upon being properly MRVed under Output 2.5 – can become a model for the forest carbon market, as one of the tangible ways to avoid degradation. It is important that this scheme, apart from its low-cost and tangible carbon benefit, brings socio-economic benefit: it permanently removes the dependence of rural villagers (and especially women) on harvesting fuel wood to meet household energy needs (a labour intensive occupation that has an opportunity cost in terms of the time budget available for education, travel and alternative income generation. Because it is hard physical work, it affects the health of people, and since many families are headed by women and assisted in labor by children, it places an especially high burden for women and children. It is recognized that it is critical that women play an equal role in the decision-making process, that is, they are equally treated in both the planning and management of natural resources so that they can determine their own future. This is important not just from a gender or governance perspective but also from a conservation perspective when one considers that women play an important role in the management of biodiversity and in rural circumstances women often have a high dependency on

biodiversity and other natural resources for their livelihood security and its sustainable management is of real and practical concern to them. In addition to the benefits of the access to solar heating, additional gender-relevant activities are focused on the following:

- In the design of protected area management plans (Output 3.1) and delineation and design of buffer zone activities (Output 3.2), at least 50% of representatives of rural communities will be women
- In the design of the sustainable livelihood support activities (Output 3.3), at least 50% of the community representatives benefiting from assistance in the start up of NTFR, ecotourism or other forms of sustainable livelihoods, will be women. In total, about 2,000 women are expected to directly benefit from various project activities. Please see Annex L for further discussion of the engagement of women in the project and the impact on them.

With respect to the mechanism for sharing revenues from the sale of carbon offsets which will be developed among other things under Output 1.2, it requires careful calculation about what proportion of the sales will be routinely included in the offset purchase agreements as that which belongs to local communities. It is impossible to say which mechanism it is going to be without doing an elaborate analysis of the situation in the region and comparing it with similar approaches employed under REDD pilots elsewhere in the world. As a result of the PPG, the Government has considered that at least 10% of sales will be assigned back to communities.

The protected areas are likely to be designated as IUCN IV or VI category sites, meaning that they will be managed reserves where limited economic activities are allowed provided they do no harm. The alternative livelihood activities are indeed proposed in the project (new Output 3.3, focusing on promotion of NWFPs and eco-tourism). These will be operationalized as partnerships between protected area units and local communities, mediated by local community-based organizations and NGOs, in partnership with the Small Grants Program in Turkey. These fully fit in the named IUCN PA categories, and hence can be implemented (if well managed) without violating protected area regulations. The restrictions referred to are those related to large-scale economic projects which disrupt the ecosystems – these will need indeed to be installed and will be reflected in the modified territorial plans for the neighboring districts. Further, this distinction between which activities are allowed and which not will be clearly reflected in the management plans to be developed under Outputs 3.1 and 3.2. Certainly, no families will be relocated. There are no indigenous peoples in Turkey.

RESULTS AND RESOURCES FRAMEWORK

<p>This project will contribute to achieving the following Country Programme Outcome as defined in the 2011 – 2015 CPD for Turkey</p> <p>Outcome 3: Strengthening policy formulation and implementation capacity for the protection of the environment, and cultural heritage in line with sustainable development principles and taking into consideration climate change and disaster management</p>
<p>Country Programme Outcome Indicators:</p> <p>Reductions in the level greenhouse gas emissions.</p>
<p>Primary applicable Key Environment and Sustainable Development</p> <p>Key Result Area 4.1. Mainstreaming environment and energy</p> <p>Key result area 4.3. Promoting climate change adaptation</p>
<p>Applicable GEF Strategic Objective and Program:</p> <p>BD-1</p> <p>Outcome 1.1 Improved management effectiveness of existing and new protected areas.</p> <p>Output 1.1. New protected areas (number) and coverage (hectares) of unprotected ecosystems.</p> <p>Output 1.2. New protected areas (number) and coverage (hectares) of unprotected threatened species (number).</p> <p>CCM-5</p> <p>Outcome 5.1. Good management practices in LULUCF adopted both within the forest land and in the wider landscape</p> <p>Outcome 5.2. GHG emissions avoided and carbon sequestered</p> <p>Output 5.1. Carbon stock monitoring systems established</p> <p>Output 5.2. Forests and non-forest lands under good management practices</p> <p>CCM-3</p> <p>Outcome 3.2 Investment in renewable energy technologies increased</p> <p>Output 3.2 Renewable energy capacity installed</p> <p>SFM REDD-1</p> <p>Outcome 1.3 Good management practices in the wider forest landscape developed and adopted by relevant economic sectors.</p> <p>Output 1.3 Forest area (hectares) under sustainable management</p> <p>SFM REDD-2</p> <p>Outcome 2.1 Enhanced institutional capacity to account for GHG emission reduction and increase in carbon stocks.</p> <p>Output 2.1 National forest carbon monitoring systems in place</p>
<p>Applicable GEF Expected Outcomes: As per project framework on page 1 of the CEO Endorsement Document</p>
<p>Applicable GEF Outcome Indicators: As per project framework on page 1 of the CEO Endorsement Document</p>

Project Strategy	Objectively Verifiable Indicators	Baseline	Target ³⁴	Sources of verification	Risks and Assumptions
Objective: To promote an integrated approach to management of forests in Turkey, demonstrating multiple environmental benefits in high conservation value forests in the Mediterranean forest region	Area of forest landscapes in Turkey with integrated forest-plans developed and under implementation that deliver multiple environmental benefits (biodiversity, climate change), ha.	0	0.45 mln ha	Forest management plans of Forest Enterprise Directorates (FED)	Ongoing institutional rivalries do not limit full implementation of updated policy framework
Component 1. Policy and institutional framework for integrated forest management within landscape	LULUCF Unit	No properly capacitated LULUCF Unit in the Government	One adequately staffed and funded LULUCF unit with technical capacities to drive forest carbon efforts forward in the country	GDF staffing table and annual budgets	Global systemic development of carbon credit systems (market and/or other) provides long-term, viable and adequate support for forest sector credit generation
	Forest protected area regulatory framework	No legal framework defining forest PA expansion and integration within broader landscape	Effective regulatory framework enables GDF to establish forest PAs based on combined SFM criteria, including biodiversity and carbon	Revised enabling regulation	
	MRV for forest-based mitigation and sequestration	No MRV	One MRV for forest-based mitigation and sequestration in Turkey is developed, with initial emphasis on Mediterranean region.	Project reporting re. MRV and FIS database	
	Forest sector Nationally Appropriate Mitigation Action (NAMA)	No NAMA	One fully developed NAMA covering 2-4 million ha Mediterranean-region forests	Submitted NAMA proposal	

³⁴ The target timeframe for all indicators is by project end, unless otherwise stated.

Project Strategy	Objectively Verifiable Indicators	Baseline	Target ³⁴	Sources of verification	Risks and Assumptions
Component 2. Implementation of forest-based GHG mitigation and carbon sequestration tools within landscape	Fire management and carbon losses from fires	Suppression-focused fire management system; annual carbon losses at five pilot sites average 3,629 tCO ₂ /y	Proactive (prevention and load management focussed) fire management methods at pilot sites generate carbon benefits of 1,646 tCO ₂ /y over baseline.	Project MRV	No significant variance from PPG calculations re. carbon benefits in individual thematic areas arise once more sophisticated measurement techniques are employed.
	Silvicultural methods consider carbon and biodiversity aspects. Assessment of associated carbon benefits.	Carbon benefits not taken into account or measured; locations not chosen to maximize connectivity enhancements.	Silvicultural approaches at pilot sites generate carbon benefits of 11,572 tCO ₂ /y along with enhanced connectivity.	Project MRV	
	Fuel wood removals and associated carbon fluxes.	High levels of legal and illegal fuel wood removals for household consumption, especially home heating, with resulting annual carbon losses at five pilot sites averaging 18,775 tCO ₂ /y. No alternative system to replace fire wood consumption in place.	Expansion of micro-credit program into Mediterranean region generates carbon benefits of 13,038 tCO ₂ /y over baseline	Project MRV	
	Integrated pest management (IPM) and associated carbon fluxes	No proactive IPM, resulting annual carbon losses at five pilot sites averaging 45,286 tCO ₂ /y.	Introduction of IPM methods and establishment of two pest centres generates carbon benefits of 30,191 tCO ₂ /y over baseline.	Project MRV	
	Carbon protocols designed and completed before, during and after implementation of enhancement and mitigation efforts	No carbon protocol	Introduction of carbon protocols in line with MRV system (Output 1.3) enabling integration of climate change into forest management plans through a central LULUCF Database under Forest Information System (FIS) Project of GDF.	Project MRV; Forest Management Plans	
Component 3.	Extent of forest Pas	Mediterranean forest	Effective protection extended to 79,960	Official	Newly gazetted areas

Project Strategy	Objectively Verifiable Indicators	Baseline	Target ³⁴	Sources of verification	Risks and Assumptions
Strengthening protection of high conservation value forests in Mediterranean landscape		habitats are under-represented in national PA system	ha, including under-represented Mediterranean forest habitats.	gazette; Forest management plans	are adequately protected through management plans and associated measures
	PA management effectiveness: METT Score	Aladağlar National Parks - 35 METT Score Kartal Lake Nature Reserve - 21 METT score	Aladağlar National Parks - 40 METT Score Kartal Lake Nature Reserve - 40 METT score	METT scorecards	
	Improvement in biodiversity indicator species at pilot sites	See baseline values for pilot sites in table below	See target values for pilot sites in table below	Ecological surveys	
	Carbon benefits from forest Pas	Areas are subject to regular logging according to management plans, carbon pools diminishing.	Net carbon benefit associated with new conservation areas estimated at 64,245 t CO2e/year.	Project MRV	

Baseline and target values of biodiversity indicator species for pilot implementation sites

ANDIRIN FED

English name	Scientific Name	IUCN National Threat Category	Baseline	Target
Brown Bear	<i>Ursus arctos</i>	LC	3 individuals Low population status	4 individuals Moderate population status
White-backed Woodpecker	<i>Dendrocopos leucotos</i>	VU	2 individuals Low population status	4 individuals Low population status
	<i>Flueggea anatolica</i>	CR	8 small population Very Low	10 population Very Low

GAZIPASA FED

English name	Scientific Name	IUCN National Threat Category	Baseline	Target
Brown Bear	<i>Ursus arctos</i>	LC	3 individuals Low population status	4 individuals Moderate population status
White-backed Woodpecker	<i>Dendrocopos leucotos</i>	VU	3 individuals Low population status	4 individuals Low population status
	<i>Lycaena ottomana</i>	VU	2 populations Very Low	4 populations Low

GULNAR FED

English name	Scientific Name	IUCN National Threat Category	Baseline	Target
Brown Bear	<i>Ursus arctos</i>	LC	2 individuals Low population status	4 individuals Moderate population status
White-backed Woodpecker	<i>Dendrocopos leucotos</i>	VU	2 individuals Low population status	4 individuals Low population status
	<i>Melanargia wiskotti</i>	VU	3 populations Very Low	5 populations Low
	<i>Ophrys isaura</i>	EN	Few individuals in 3 populations Very Low	Increased number of individual in 3 populations Low

KOYCEGIZ FED

English name	Scientific Name	IUCN National Threat Category	Baseline	Target
Brown Bear	<i>Ursus arctos</i>	LC	2 individuals Low population status	4 individuals Moderate population status
White-backed Woodpecker	<i>Dendrocopos leucotos</i>	VU	2 individuals Low population status	4 individuals Low population status

White-tailed Eagle	<i>Haliaeetus albicilla</i>	CR	Low	5 populations Low
	<i>Lyciasalamandra fazilae</i>	EN	4 populations Very loow	6 populations Low
	<i>Genista sandrasica</i>	EN	3 populations Very low	4 populations Very low
Oriental Sweet Gum	<i>Liquidambar orientalis</i>	VU	600 he. Low	620 he. Low
	<i>Silene koycegizensis</i>	CR	3 populations Very low	4 populations Very low

POS FED

English name	Scientific Name	IUCN National Threat Category	Baseline	Target
Grey Wolf	<i>Canis lupus</i>	LC	6 individuals Low population status	10 individuals Moderate population status
White-backed Woodpecker	<i>Dendrocopos leucotos</i>	VU	2 individuals Low population status	4 individuals Low population status
Black Woodpecker	<i>Dryocopus martius</i>	NT	4 individuals Low	8 populations Moderate Population Status
	<i>Centaurea ptosimopappoides</i>	CR	2 populations Very low	3 populations Very Low

TOTAL BUDGET AND WORK PLAN

Award ID:	00070163
Award Title:	PIMS 4434 FSP BD: Integrated Forest Management
Business Unit:	UNDP Turkey-TUR10
Project Title:	Integrated approach to management of forests in Turkey, with demonstration in high conservation value forests in the Mediterranean region
Atlas Project ID	00084294
PIMS number:	4434
Implementing Partner (Executing Agency)	General Directorate of Forestry (GDF), Ministry of Forestry and Water Affairs

GEF Outcome/ Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budget Account Code	Atlas Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	Budget Note
Outcome 1	GDF/UNDP	62000	GEF									
				71200	International Consultants	25,000	20,000	10,000	17,500	7,500	80,000	1
				71300	Local Consultants	95,125	46,125	26,250	5,000	5,000	177,500	2
				71400	Contractual Services - Individ	10,080	10,080	10,080	10,080	10,080	50,400	3
				72100	Contractual services - Companies	87,250	59,500	52,500	37,500	40,000	276,750	4
				75700	Workshops	46,500	28,500	17,000	7,000	9,000	108,000	5
				71600	Travel	15,200	9,900	5,250	8,500	7,000	45,850	6
				74200	Audio Visual&Print Prod Costs	9,000	19,000	13,500			41,500	7
					Total Outcome 1	288,155	193,105	134,580	85,580	78,580	780,000	
Outcome 2	GDF/UNDP	62000	GEF									
				71200	International Consultants	29,200	19,200	9,200	9,200	9,200	76,000	8
				71300	Local Consultants	250,500	200,000	113,400	46,800	36,800	647,500	9
				71400	Contractual Services - Individ	41,170	41,170	41,170	41,170	41,170	205,850	10
				72100	Contractual services - Companies	364,770	311,860	264,770	238,270	179,270	1,358,940	11
				75700	Workshops	130,000	110,000	125,000	89,150	70,000	524,150	12
				71600	Travel	48,600	32,650	32,800	20,700	41,380	176,130	13
				72200	Equipment & Furniture	50,000	20,000	300,000	0	0	370,000	14
				74200	Audio Visual&Print Prod Costs	176,700	151,000	137,000	100,000	51,000	615,700	15
					Total Outcome 2	1,090,940	885,880	1,023,340	545,290	428,820	3,974,270	

GEF Outcome/ Atlas Activity	Responsible Party/ Implementing Agent	Fund ID	Donor Name	Atlas Budget Account Code	Atlas Budget Description	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)	Budget Note
Outcome 3	GDF/UNDP	62000	GEF									
				71200	International Consultants	10,000	12,500	0	0	0	22,500	16
				71400	Contractual Services - Individ	20,000	20,000	20,000	10,000	10,000	80,000	17
				72100	Contractual services - Companies	340,700	255,000	151,800	45,000	50,400	842,900	18
				75700	Workshops	135,000	80,000	120,000	60,000	10,000	405,000	19
				71600	Travel	29,180	25,550	25,000	18,000	6,500	104,230	20
				72200	Equipment & Furniture	15,000	0	10,000	0	0	25,000	21
				72610	Micro Capital Grants - Credit			100,000	100,000		200,000	22
				74200	Audio Visual&Print Prod Costs		35,000	16,000	20,000	15,100	86,100	23
					Total Outcome 3	549,880	428,050	442,800	253,000	92,000	1,765,730	
Project Mngmt,	GDF/UNDP	62000	GEF									
				71400	Contractual Services - Individ	83,550	83,550	83,550	83,550	83,550	417,750	24
				72100	Contractual services - Companies	20,000	20,000	20,000	20,000	20,000	100,000	25
				71600	Travel	10,480	10,480	10,480	10,480	10,480	52,400	26
				72200	Equipment and Furniture	10,000	7,500				17,500	27
				72400	Communic & Audio Equip	2,000	2,000	2,000	2,850	2,000	10,850	28
				74500	Miscellaneous Expenses	200	300	400	300	300	1,500	29
					Total Management	126,230	123,830	116,430	117,180	116,330	600,000	
GRAND TOTAL						2,055,205	1,630,865	1,717,150	1,001,050	715,730	7,120,000	

Budget Notes:

Budget Note	Explanation
1	International LULUCF Expert covering work under Output 1.1 – 3,000*10 weeks=30,000; International NAMA Expert under Output 1.5 – 3,000*15 weeks=45,000; International Evaluation Expert for mid-term and final evaluation of Outcome 1- 2,500*2weeks=5,000
2	Local LULUCF Expert covering work under Output 1.1. and Outpu 1.4. – 2,500*42 weeks=105,000; Local Policy Expert covering work under 1.2. – 1,250*12 weeks=15,000; Local NAMA Expert work under Output 1.5. – 2,500*14 weeks=35,000; Local Sustainable Forest Management (SFM) Expert covering Output 1.2. and 1.4. – 1,250*6 weeks=7,500; Local MRV Expert covering Output 1.3. – 2,500*6 weeks. Local consultants will be working in collaboration with international consultants for regulatory and methodology enhancements, capacity development, LULUCF, MRV system and NAMA. Details provided in Annex C.
3	Project Manager (PM) and Project Associate (PA) technical input to Outcome 1. PM will allocate 9% of his/her time while PA will allocate 17% of

Budget Note	Explanation
	his/her time for technical coordination of Outcome 1.
4	Subcontractors for stakeholder consultation meetings and national/regional knowledge-sharing meetings covering Output 1.1. – 1.5. This budget line covers meetings at national and regional level for capacity building and awareness raising activities of Outcome 1.
5	This budget line covers technical workshops to be held at local and national level for Output 1.1. – 1.5.
6	Travel of local and international consultants (International and Local LULUCF Expert, International and Local NAMA Expert, International Evaluation Expert, Local Policy Expert, Local SFM Expert and Local MRV Expert) for implementation of Outcome 1.
7	Printing and publication of knowledge products, posters, leaflets and workshop materials to be prepared under Output 1.1. – 1.5.
8	International MRV and Carbon Accounting (MRV) Expert covering work under Output 2.5 – 3,000*12 weeks=36,000; International Fire Management Expert covering works under Output 2.1. – 2,500*4 weeks=10,000; International Silviculture Expert covering work under Output 2.2. – 2,500*4 weeks=10,000; International Pest Management Expert covering works under Output 2.4. – 2,500*4weeks=10,000; International Evaluation Expert for mid-term and final evaluation of Outcome 2- 2,500*4weeks=10,000
9	Local Fire Management Expert covering work under Output 2.1. – 1,250*80weeks=100,000; Local Silviculture Expert covering work under 2.2. – 1,250*80weeks=100,000; Local Micro-Credit Expert covering work under Output 2.3. – 2,500*22 weeks=55,000; Local Pest Management Expert covering work under Output 2.4. – 1,250*118weeks=147,500; Local GIS Expert covering work under Output 2.5. – 1,250*14weeks=17,500; Local Plantation Expert covering works under Output 2.2. – 2,500*25weeks=62,500; Local Sustainable Forest Management (SFM) Expert covering Output 2.1. and 2.5. – 1,250*82 weeks=102,500; Local MRV Expert covering Output 2.5. – 2,500*25weeks=62,500. Local consultants working in collaboration with international consultants for preparation of LULUCF database and carbon protocols, integration of carbon protocols into forest management plans, monitoring of fuelwood removals, integrated fire management, carbon-focused silviculture trainings, integrated pest management, micro-credit programme for alternative heating systems and carbon accounting methods. Details provided in Annex C.
10	Budget for technical assistant and co-operation to be provided by service contracts for successful implementation of Outcome 2. Project Manager (PM), Project Associate (PA) and Project Finance and Procurement Officer (PFO) will provide technical input to Outcome 2. PM will allocate 37% of his/her time while PA will allocate 27% of his/her time for technical coordination of Outcome 2. PFA will allocate 10 % of his/her time to be used for micro-crediting programme to be applied under Outcome 2.3.
11	This budget line covers subcontractors for (i) regional and national meetings for Output 2.1 Integrated Fire Management System in 5 Forest Enterprise Directorate (FED) (349,650); (ii) regional and national meetings for Output 2.2 Enhanced silvicultural efforts (187,000); (iii) national and local meetings for Output 2.3 Micro-crediting programme for solar energy in 5 FED (122,500); (iv) regional and national meetings for Output 2.4 Integrated Pest Management System in 5 FED (105,000); (v) establishment of LULUCF database (450,000) and preparation/revision of 5 FED management plans (144,790) under Output 2.5 Carbon stock and stock change measurements in 5 FED.
12	This budget line covers technical workshops to be held at local and national level for (i) Output 2.1 (175,550); (ii) Output 2.2 (98,000); (iii) Output 2.3 (25,600); (iv) Output 2.4 (125,000); (v) Output 2.5 (100,000)
13	Travel of local and international consultants (International and Local Silviculture Expert, International and Local Integrated Fire Management Expert, International and Local Integrated Pest Management Expert, International and Local MRV Expert, International Evaluation Expert, Local Micro-credit Expert, Local GIS Expert, Local Plantation Expert, Local SFM Expert) for implementation of Outcome 2.
14	Technical equipment for Output 2.4 Integrated pest management and Output 2.5 Carbon stock and stock change measurements: (i) 15 portable weather stations (15,000); (ii) two pest laboratories (185,000) to be established by the Government as a co-finance, and a server for LULUCF

Budget Note	Explanation
	database (170,000).
15	Printing and publication of knowledge products, posters, leaflets and workshop materials for Outcome 2. A documentary film will be prepared to be used not only for training material for dissemination of carbon focused forestry activities but also for awareness raising among stakeholders, to be used during and after project implementation.
16	International Non-Wood Forest Products and Value Chain Expert covering works under Output 3.3 – 2,500*7weeks=17,500; International Evaluation Expert for mid-term and final evaluation of Outcome 3- 2,500*2weeks=5,000. International consultant for non-wood forest products business plan and value chain studies in and around Protected Forests to be identified in Output 3.
17	Budget for technical assistant and co-operation to be provided by service contracts for successful implementation of Outcome 3. Project Manager (PM), Project Associate (PA) and Project Finance and Procurement Officer (PFO) will provide technical input to Outcome 3. PM will allocate 14% of his/her time while PA will allocate 6% of his/her time for technical coordination of Outcome 3. PFA will allocate 9 % of his/her time to be used for micro-crediting programme to be applied under Outcome 3.3.
18	Subcontractors for (i) Output 3.1 Improved protection of high nature value forests in five pilot sites covering 79,960 ha (412,500); (ii) Output 3.2 Buffer zones and corridors embedding PAs (Protection Areas) and PFs (Protected Forests) in the wider production landscapes (375,400), and (iii) Output 3.3 Partnerships for eco-tourism and NWFP management (55,000).
19	This budget line covers technical workshops to be held at local and national level for (i) Output 3.1 (175,550); (ii) Output 3.2 (150,450); (iii) Output 3.3 (79,000)
20	Travel of subcontractors and international consultants (International Non-Wood Forest Products and Value Chain Expert, International Evaluation Expert) for implementation of Outcome 3.
21	Equipment need to be used during field visits for species monitoring and evaluation, i.e. pairs of binoculars, spotting scopes, sound recorder, etc.
22	Government's micro-credit programme will be directed to the forest villagers to reach alternative income generation activities where protected forests will be established as defined under Output 3.3. USD 200,000 micro credit facilitation will enhance forest villagers to be benefited from Government's micro-credit programme for ecotourism and non-wood forest products.
23	Printing and publication of knowledge products, posters, leaflets and workshop materials for micro-credit programme on ecotourism and non-wood forest products' harvesting for Outcome 3.
24	Cost of Project Manager, Project Finance and Procurement Officer and a Project Associate (Annex C of CEO Request provides details on total weeks, weekly rate and terms of reference)
25	This budget line covers management-related meetings for the project management team at local and national level.
26	Management-related travel to/from project sites for the project management team to enable hands-on management.
27	Cost of 4 computers (12,000), office furniture (5,000), and 4 mobile phone (500) for the project management unit
28	Printing of different materials for dissemination of project experience and telecommunication expenses of the project management unit.
29	Stationery for office.

Summary of Funds:³⁵

	Amount Year 1 (USD)	Amount Year 2 (USD)	Amount Year 3 (USD)	Amount Year 4 (USD)	Amount Year 5 (USD)	Total (USD)
GEF	2,055,205	1,630,865	1,717,150	1,001,050	715,730	7,120,000
UNDP	246,000	205,000	205,000	82,000	82,000	820,000
General Directorate of Forestry	5,820,000	5,820,000	3,000,000	3,000,000	1,760,000	19,400,000
GIZ	320,000	180,000	50,000	25,000	25,000	600,000
Chamber of Forest Engineers	40,000	40,000	40,000	20,000	20,000	160,000
Nature Conservation Center	75,000	25,000	25,000	25,000		150,000
WWF Turkey	25,000	75,000	25,000	25,000		150,000
Forest Cooperative			30,000	20,000		50,000
Gold Standard	50,000	25,000	25,000			100,000
TOTAL (not including PPG)	8,631,205	8,000,865	5,117,150	4,198,050	2,602,730	28,550,000

Sources of confirmed co-financing:³⁶

Name of co-financier	Co-financing amount (USD)
General Directorate of Forestry	19,400,000
UNDP	820,000
GIZ	600,000
WWF Turkey	150,000
Nature Conservation Center	150,000
Chamber of Forest Engineers	160,000
The Central Union of Turkish Forestry Cooperatives	50,000
Gold Standard Foundation	100,000
Total co-financing	21,430,000

³⁵ Summary table includes all financing of all kinds: GEF financing, cofinancing, cash, in-kind, etc.

³⁶ Details of the co-financing all of type will be identified during the inception phase. Contribution details of General Directorate of Forestry is available as Annex S. An indicative budget and workplan is available as Annex T.

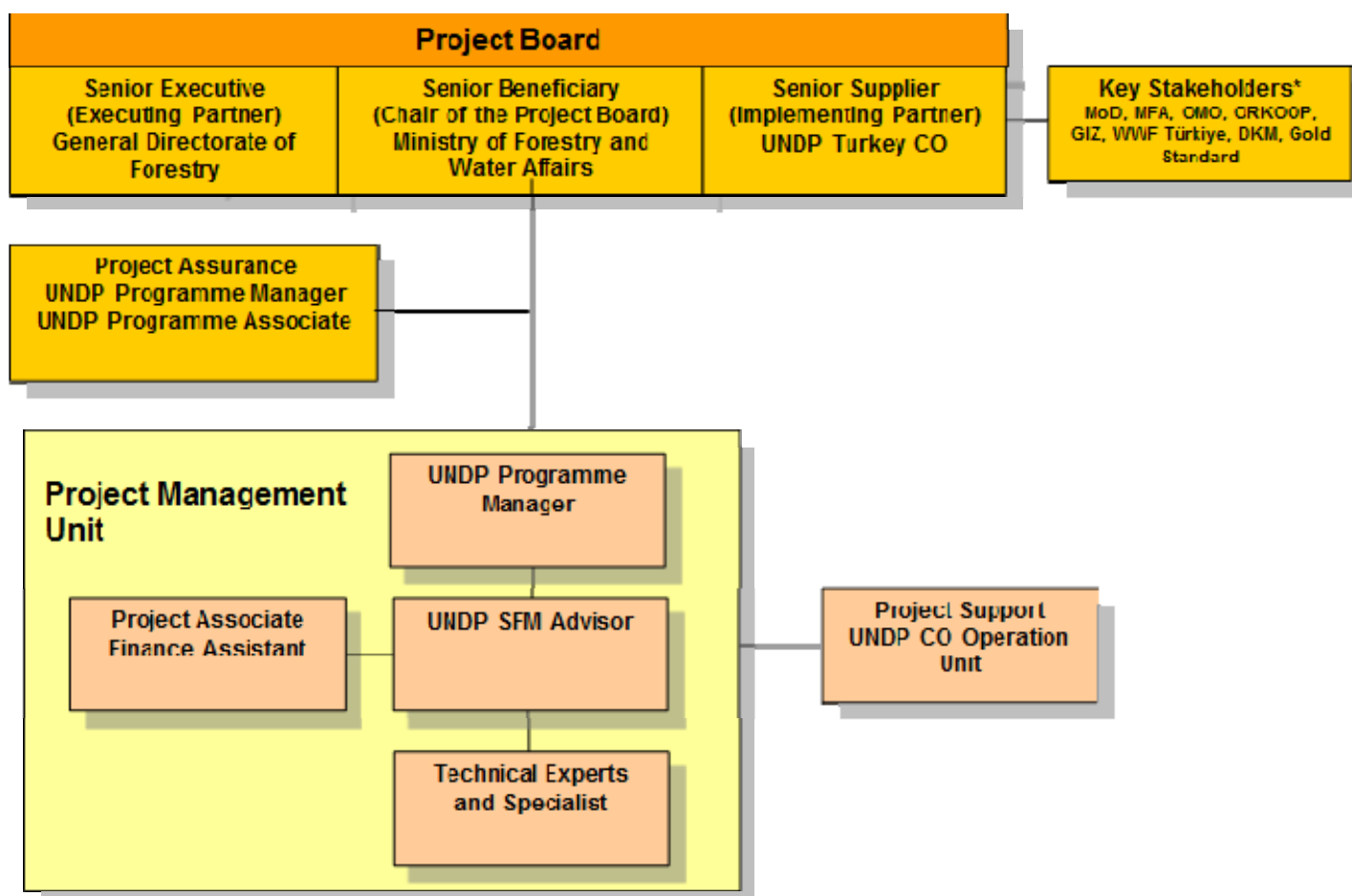
I. MANAGEMENT ARRANGEMENTS

A. Institutional arrangement

UNDP is the Implementing Partner for this project. The project fully complies with the comparative advantages matrix approved by the GEF Council. UNDP Turkey has been successfully managing a portfolio of technical assistance and capacity building initiatives in the areas of biodiversity conservation, prevention of land degradation and climate change mitigation. UNDP Turkey has extensive experience and expertise in policy advice, project management in a highly challenging technical assistance environment in the country, as well as an extensive network of national partners. Further details on UNDP programs are provided in Section C above.

B. Project Implementation Arrangements

The project will be executed by the General Directorate of Forestry, Ministry of Forestry and Water Affairs. The project organization structure (summarized in the figure below) will consist of a Project Board, Project Assurance and a Project Implementation Unit (PIU). Roles and responsibilities are described below.



* MoD (Ministry of Development) and MFA (Ministry of Foreign Affairs) are natural members of the Project Board with a role to link the project results to the national development policy and oversight for international agreements. Other key stakeholders will be invited to the Project Board meetings on ad-hoc basis in line with the agenda of the meeting.

Project Board: The Project Board will be responsible for making management decisions for the project, in particular when guidance is required by the Project Manager. It will play a critical role in project monitoring and evaluations by assuring the quality of these processes and associated products, and by using evaluations for improving performance, accountability and learning. The Project Board will ensure that required resources are committed. It will also arbitrate on any conflicts within the project and negotiate solutions to any problems with external bodies. In addition, it will approve the appointment and responsibilities of the Project Manager and any delegation of its Project Assurance responsibilities. Based on the approved Annual

Work Plan, the Project Board can also consider and approve the quarterly plans and also approve any essential deviations from the original plans.

In order to ensure UNDP's ultimate accountability for project results, Project Board decisions will be made in accordance with standards that shall ensure management for development results, best value money, fairness, integrity, transparency and effective international competition. In case consensus cannot be reached within the Board, the final decision shall rest with the UNDP Project Manager.

Members of the Project Board will consist of key national governmental and non-governmental agencies, and appropriate local level representatives. UNDP will also be represented on the Project Board, which will be balanced in terms of gender. Potential members of the Project Board will be reviewed and recommended for approval during the PAC meeting. The Project Board will contain three distinct roles:

Senior Beneficiary (Chairman of Project Board) – Ministry of Forestry and Water Affairs: This role requires representing the interests of General Directorate of Forestry who will ultimately benefit from the project. The Senior Beneficiary's primary function within the Board will be to ensure the realization of project results from the perspective of project beneficiaries. This role will rest with the other institutions (key national governmental and non-governmental agencies, and appropriate local level representatives) represented on the Project Board, who are stakeholders in the project.

Senior Executive (Executing Partner) - General Directorate of Forestry: This individual will represent the project "owners" and will chair the group. It is expected that Ministry of Forestry and Water Affairs (MFWA) will appoint a senior official to this role who will ensure full government support of the project.

Senior Supplier (Implementing Partner) – United Nations Development Programme: This role requires the representation of the interests of the parties concerned which provide funding for specific cost sharing projects and/or technical expertise to the project. The Senior Supplier's primary function within the Board will be to provide guidance regarding the technical feasibility of the project. This role will rest with UNDP-Turkey represented by the Resident Representative.

Project Assurance: The project assurance role supports the Project Board by carrying out objective and independent project oversight and monitoring functions. This role ensures appropriate project management milestones are managed and completed. Project Assurance has to be independent of the Project Manager; therefore, the Project Board cannot delegate any of its assurance responsibilities to the Project Manager. The Project Assurance role will rest with the UNDP Turkey Environment Focal Point.

A Project Management Unit (PMU) will be established comprising permanent staff including: a Project Manager (PM), a Project Associate and a Project Finance and Procurement Officer. The PIU will assist GDF in performing its role as implementing partner. The Project Manager has the authority to run the project on a day-to-day basis on behalf of the Implementing Partner within the constraints laid down by the Board. The Project Manager's prime responsibility is to ensure that the project produces the results specified in the project document, to the required standard of quality and within the specified constraints of time and cost. The PM will be recruited in accordance with UNDP regulations and will be based in Ankara. S/he will report to the UNDP Focal Point on Energy and Environment. The PM will be responsible for overall project coordination and implementation, consolidation of work plans and project papers, preparation of quarterly progress reports, reporting to the project supervisory bodies, and supervising the work of the project experts and other project staff. The PM will also closely coordinate project activities with relevant Government institutions and hold regular consultations with other project stakeholders and partners. Under the direct supervision of the PM, the Project Associate will be responsible for administrative issues while Project Finance and Procurement Officer will be responsible for financial issues, and will get support from UNDP-CO administration.

The permanent core technical staff of the project will be a Chief Expert on Sustainable Forest Management. S/he will supervise a team of national specialists who will implement specific activities of the project at the local level. The PM, Chief Expert and national specialists will spend a large portion of their time in the field, and the PM will be ultimately responsible for liaison with communities engaged in the project.

The PIU, following UNDP procedures on implementation of NIM projects, will identify national experts and consultants, and international experts as appropriate to undertake technical work. The national and international companies may also be involved in project implementation. These consultants and companies will be hired under standard prevailing UNDP procedures on implementation of NIM projects. The UNDP Country Office will provide specific support services for project realization through the Administrative and Finance Units as required.

Key Stakeholders

The Ministry of Foreign Affairs	The Ministry of Foreign Affairs (MFA) is natural member of the Project Board with a responsibility for defining, assessing, and monitoring programme outputs towards country-level outcomes. MFA will work closely with UNDP to ensure that the plan of the programme includes necessary aspects, including identification of projects required to achieve the expected outcomes.
The Ministry of Development	The Ministry of Development (MoD) is natural member of the Project Board with a responsibility for defining, assessing, and monitoring programme outputs towards country-level outcomes to ensure that the project results have been linked to the national development plans. MFA will work closely with UNDP to ensure that the plan of the programme includes necessary aspects, including identification of projects required to achieve the expected outcomes.
The Ministry of Forestry and Water Affairs, General Directorate of Forestry (GDF)	The major partner for SFM policy-making and programming activities; it will contribute to the project by making joint decisions on forest conservation activities and by linking forest conservation actions with Turkey's commitments to international conventions. The Ministry of Forestry and Water Affairs is the project proponent, as it is critical to realizing its commitment to develop the Nationally Appropriate Mitigation Action for the forestry sector, under the Cancun agreements. The General Directorate of Forestry (GDF) is the key target agency for the SFM activities. GDF's Regional Forest Directorate, Forest Enterprise Directorate (FED) and Forest Enterprise Sub-Directorate will oversee the implementation of the CCM, BD and SFM activities. GDF will coordinate the development of the post 2014 Forestry Policy Document and forestry NAMA, seeking approval of amendments to existing forest legislation as necessary to promote sustainable forest management. GDF's ORKOY (Forest Village Relations Department) will coordinate and co-finance the solar heating revolving fund. GDF is also key in the development of the forest carbon monitoring and accounting system. GDF will provide training facilities for the project's capacity building activities, and its staff will be direct beneficiaries of the project's capacity building efforts. GDF will co-finance forestry activities on silviculture, fire and pest management activities where GEF support will be used to modify those activities to focus on climate change mitigation. GDF will establish a new LULUCF Unit that will lead the design and manage the application of the forest carbon monitoring system for the purposes of UNFCCC reporting in close collaboration with other relevant departments in the same organization. GDF will also identify and declare new Protected Forests within 5 pilot sites where climate change and biodiversity indicators will be identified and improved.
CSO - Chamber of Forest Engineers (CFE)	Chamber of Forest Engineers will play major role on capacity enhancement activities under Component 1 with its more than 10,000 members. Members of CFE who are also the staff of GDF are direct beneficiaries of the project's capacity enhancement efforts. Since CFE is a member of Union of Chambers of Turkish Engineers and Architects, it examines related legislation, norms, scientific specifications and standard contracts and similar and relevant scientific documents related to forestry and make suggestions concerning their amendment, improvement or re-application. CFE will play a role to prepare MRV and NAMA standards in collaboration with GDF.
CSO – The Central Union of Turkish Forestry Cooperatives	The Central Union of Turkish Forestry Cooperatives will be active on implementation of activities related to forest villagers, i.e. trainings of Output 2.1., Output 2.3., and Output 3.3. Their local branches will play a vital role for engagement of local communities and women during undertaking of activities where forest villagers need to be a part of decisions and/or implementation such as designation of PFs and integration of biodiversity into the forest management plans,

	as well as in mediating for the micro-revolving fund on solar heaters, eco-tourism and non-wood forest products initiatives.
CSO – Nature Conservation Center (NCC)	The Nature Conservation Center is the key partner for implementing of Component 3 with its experience on biodiversity protection and forest protected area management, integrating climate change scenario on forest management plans and identification of PFs. Since NCC works in collaboration with GDF for a decade on forest biodiversity, their implementation capacity and existing experience will be used to enhance existing forest biodiversity protection at a landscape level.
CSO – WWF Turkey	WWF Turkey, through its global network, will bring in know-how, technical experience and innovative approaches on sustainable forest management, forest and climate change related issues. WWF Turkey will play a key role on Component 2 with demonstration activities on silviculture, fire and pest management interventions focusing on climate change mitigation benefits.
GIZ	GIZ with its regional project “Adapting forest policy conditions to climate change in the MENA region” undertakes activities on improving political framework conditions for sustainable management of forest ecosystems in order to preserve forest-related environmental services in the context of climate change in selected countries of the MENA region, including Turkey. GIZ will play a vital role in the project to improve existing regional cooperation focused on forest and climate change, and to support capacity enhancement activities at national and regional level under Component 1.
Gold Standard	Gold Standard, with its international experience and know-how on MRV and NAMA, will play an important role on elaboration of MRV, the revenue-sharing mechanism, NAMA and carbon projects to be developed during demonstration activities on 5 pilot sites.

II. MONITORING FRAMEWORK AND EVALUATION

The project team and the UNDP Country Office (UNDP-CO), supported by the UNDP/GEF Regional Coordination Unit in Bratislava, will be responsible for project monitoring and evaluation conducted in accordance with established UNDP and GEF procedures. The [Project Results Framework in Annex A](#) provides performance and impact indicators for project implementation, along with their corresponding means of verification. The GEF Biodiversity, Climate Change Mitigation and Sustainable Forest Management Tracking Tools will also be used to monitor progress on institutional-policy capacity building under Outcome 1, avoided emission and enhanced carbon stocks to be achieved under Outcome 2 and mainstreaming biodiversity conservation in protected forests to be established under Outcome 3. The following sections outline the principle components of the M&E plan and indicative cost estimates related to M&E activities. The project's M&E plan will be presented to all stakeholders at the Project's Inception Workshop and finalized following a collective fine-tuning of indicators, means of verification, and the full definition of project staff M&E responsibilities. The M&E plan and budget is provided in **Table M&E** below.

Carbon monitoring: Given the important focus of the project on avoiding emission and increasing sequestration, particular emphasis will be placed on monitoring these reductions. Output 2.5 will measure, report and verify carbon stock and stock change at five pilot sites using the methodology to be designed for MRV for the forestry sector in Output 1.3. MRV to be designed builds on the existing national forest inventory system while incorporating: (i) the LULUCF GPG approach and (ii) national coefficients for fire and pest outbreaks. MRV will be further enhanced through the use of remote sensing techniques. However, new instrumental measurements such as Eddie Covariance will not be used, as these are considered too costly and to add too little value. Details are presented in Annex K.

Biodiversity monitoring: Monitoring of biodiversity will also be carried out, with special indicators such as focal forest species. The focal forest species are defined as those species that are dependent on forest, in need of conservation, representative of other biodiversity elements and whose situation can be improved more with unit effort for conservation. For each of the five pilot sites, special monitoring and evaluation protocols will be established for focal forest species. For each species, the sum of scores for each criterion under a category will be summed and divided by the highest possible score under that category. Then, the average score from all categories will be calculated as the final score of a species. Final scores will range from 0.0 to 1.0. More detailed monitoring and evaluation plans for each site will be prepared following the creation of protected forests under Output 3.1.

Project start:

A Project Inception Workshop will be held within the first two months of project start. Workshop participants will include all those with assigned roles in the project organization structure, UNDP country office and, where appropriate/ feasible, regional technical policy and programme advisors as well as other stakeholders. The Inception Workshop is crucial to build ownership in the project targets and to agree on the first year's annual work plan. The Inception Workshop will address a number of key issues, including:

- Assist all partners to fully understand and take ownership of the project.
- Detail roles, support services and complementary responsibilities of UNDP CO and RCU staff vis-à-vis the project team.
- Discuss the roles, functions, and responsibilities within the project's decision-making structures, including reporting and communication lines, and conflict resolution mechanisms.
- The Terms of Reference for project staff will be discussed again as needed.
- Based on the project results framework and the GEF Tracking Tools mentioned above, finalize the first annual work plan.
- Review and agree on the indicators, targets and their means of verification, and recheck assumptions and risks.
- Provide a detailed overview of reporting, monitoring and evaluation (M&E) requirements. The Monitoring and Evaluation work plan and budget should be agreed and scheduled.
- Discuss financial reporting procedures and obligations, and arrangements for annual audits.

- Plan and schedule Project Board meetings. Roles and responsibilities of all project organization structures should be clarified and meetings planned. The first Project Board meeting should be held within the first 12 months following the Inception Workshop.

The Inception Workshop report will be a key reference document and will be prepared and shared with participants to formalize various agreements and plans decided during the meeting.

Quarterly:

- Progress made shall be monitored in the UNDP Enhanced Results Based Management Platform.
- Based on the initial risk analysis submitted, the risk log shall be regularly updated in ATLAS.
- Based on the information recorded in Atlas, Project Progress Reports (PPR) can be generated in the Executive Snapshot.
- Other ATLAS logs can be used to monitor issues, lessons learned, etc. The use of these functions will be a key indicator in the UNDP Executive Balanced Scorecard.

Annually:

Annual Project Review/ Project Implementation Reports (APR/PIR): This key report will be prepared to monitor progress made since project start and in particular for the previous reporting period (31 July to 15 August). The APR/PIR combines both UNDP and GEF reporting requirements. The APR/PIR includes, but is not limited to, reporting on the following:

- Progress made toward project objective and project outcomes - each with indicators, baseline data and end-of-project targets (cumulative)
- Project outputs delivered per project outcome (annual)
- Lesson learned/good practice.
- AWP and other expenditure reports
- Risk and adaptive management
- ATLAS QPR
- Portfolio level indicators (i.e. GEF focal area tracking tools.)

Periodic Monitoring through site visits:

UNDP CO and the UNDP RCU will conduct visits to project sites based on the agreed schedule in the project's Inception Report/Annual Work Plan to assess first hand project progress. Other members of the Project Board may also join these visits. A Field Visit Report/BTOR will be prepared by the CO and UNDP RCU and will be circulated no less than one month after the visit to the project team and Project Board members.

Mid-term of project cycle:

The project will undergo an independent Mid-Term Evaluation at the mid-point of project implementation. The Mid-Term Evaluation will determine progress being made toward the achievement of outcomes and will identify course correction if needed. It will: focus on the effectiveness, efficiency and timeliness of project implementation; highlight issues requiring decisions and actions, and; present initial lessons learned about project design, implementation and management. Findings of this review will be incorporated as recommendations for enhanced implementation during the final half of the project's term. The organization, terms of reference and timing of the mid-term evaluation will be decided after consultation between the parties to the project document. The Terms of Reference for this Mid-term evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The management response and the evaluation will be uploaded to UNDP corporate systems, in particular the [UNDP Evaluation Office Evaluation Resource Center \(ERC\)](#). The relevant GEF tracking tools will also be completed during the mid-term evaluation cycle.

End of Project:

An independent Final Evaluation will take place three months prior to the final Project Board meeting and will be undertaken in accordance with UNDP and GEF guidance. The Final Evaluation will focus on the delivery of the project's results as initially planned (and as corrected after the mid-term evaluation, if any such correction took place). The Final Evaluation will look at impact and sustainability of results, including the contribution to capacity development and the achievement of global environmental benefits/goals. The Terms of Reference for this evaluation will be prepared by the UNDP CO based on guidance from the Regional Coordinating Unit and UNDP-GEF. The Terminal Evaluation should also provide recommendations for follow-up activities and requires a management response which should be uploaded to PIMS and to the UNDP Evaluation Office Evaluation Resource Center (ERC). The relevant GEF tracking tools will also be completed during the final evaluation.

During the last three months of project implementation, the project team will prepare the Project Terminal Report. This comprehensive report will summarize the results achieved (objectives, outcomes, outputs), lessons learned, problems met and areas where results may not have been achieved. It will also lay out recommendations for any further steps that may be needed to ensure sustainability and replicability of the project's results.

Learning and knowledge sharing:

Results from the project will be disseminated within and beyond the project intervention zone through existing information sharing networks and forums. The project will identify and participate, as relevant and appropriate, in scientific, policy-based and/or any other networks, which may be of benefit to project implementation though lessons learned. The project will identify, analyze, and share lessons learned that might be beneficial in the design and implementation of similar future projects. Finally, there will be a two-way flow of information between this project and other projects of a similar focus.

Communications and visibility requirements:

Full compliance is required with UNDP's Branding Guidelines. These can be accessed at <http://intra.undp.org/coa/branding.shtml>, and specific guidelines on UNDP logo use can be accessed at: <http://intra.undp.org/branding/useOfLogo.html>. Amongst other things, these guidelines describe when and how the UNDP logo needs to be used, as well as how the logos of donors to UNDP projects needs to be used. For the avoidance of any doubt, when logo use is required, the UNDP logo needs to be used alongside the GEF logo. The GEF logo can be accessed at: http://www.thegef.org/gef/GEF_logo. The UNDP logo can be accessed at <http://intra.undp.org/coa/branding.shtml>.

Full compliance is also required with the GEF's Communication and Visibility Guidelines (the "GEF Guidelines"). The GEF Guidelines can be accessed at: http://www.thegef.org/gef/sites/thegef.org/files/documents/C.40.08_Branding_the_GEF%20final_0.pdf.

Amongst other things, the GEF Guidelines describe when and how the GEF logo needs to be used in project publications, vehicles, supplies and other project equipment. The GEF Guidelines also describe other GEF promotional requirements regarding press releases, press conferences, press visits, visits by Government officials, productions and other promotional items.

Where other agencies and project partners have provided support through co-financing, their branding policies and requirements should be similarly applied.

Table M&E: Project Monitoring and Evaluation Plan and Budget

Type of M&E activity	Responsible Parties	Budget (US\$)	Time frame
Inception Workshop (IW)	Project Manager Ministry of Forestry and Water Affairs, General Directorate of Forestry, UNDP, UNDP-GEF	30,000 (based on experience of UNDP CO)	Within first two months of project start up
Inception Report	Project Team Project Board, UNDP CO	None	Immediately following IW
Measurement of	Project Manager will oversee	To be finalized in	Start, mid and end

Type of M&E activity	Responsible Parties	Budget (US\$)	Time frame
Means of Verification for Project Results	the hiring of specific studies and institutions, and delegate responsibilities to relevant team members	Inception Phase and Workshop. Cost to be covered by targeted survey funds.	of project
Annual Measurement of Means of Verification for Project Progress and Performance	Oversight by Project GEF Technical Advisor ,Project Manager and M&E local expert Measurements by Forest Enterprise Directors	TBD as part of the Annual Work Plan's preparation. Cost to be covered by field survey budget.	Annually prior to APR/PIR and to the definition of annual work plans
APR/PIR	Project Team Project Board UNDP-RTA UNDP-GEF	None	Annually
QPR	Project Team (including M&E local expert)	None	Quarterly
Project Board meetings	Project Manager	None	Following IW and annually thereafter.
Technical and periodic status reports	Project team Hired consultants as needed	15,000 (based on UNDP CO experience – need to be clarified by Chris and Maxim)	TBD by Project team and UNDP-CO
Mid-term External Evaluation	Project team Project Board UNDP-GEF RCU External Consultants (evaluation team)	40,000	At the mid-point of project implementation.
Final External Evaluation	Project team, Project Board, UNDP-GEF RCU External Consultants (evaluation team)	40,000	At the end of project implementation
Terminal Report	Project team Project Board External Consultant	None	At least one month before the end of the project
Audit	UNDP-CO Project team	18,000	Yearly
Visits to field sites (UNDP staff travel costs to be charged to IA fees)	UNDP-CO, UNDP-GEF RCU Government representatives	None	Yearly average one visit per year
TOTAL (indicative) COST (Excluding project and UNDP staff time costs)		143,000	

III. LEGAL CONTEXT

This document shall be the instrument referred to as such in Article-I of the SBAA between the Government of Turkey and UNDP signed on 21 October 1965 Consistent with the attached [Supplemental Provisions](#) to the Project Document, attached hereto.

Consistent with the above Supplemental Provisions, the responsibility for the safety and security of the executing agency and its personnel and property, and of UNDP's property in the executing agency's custody, rests with the executing agency.

The executing agency shall:

- a) put in place an appropriate security plan and maintain the security plan, taking into account the security situation in the country where the project is being carried;
- b) assume all risks and liabilities related to the executing agency's security, health and safety and the full implementation of the security plan.

UNDP reserves the right to verify whether such a plan is in place, and to suggest modifications to the plan when necessary. Failure to maintain and implement an appropriate security plan as required hereunder shall be deemed a breach of this agreement.

The executing agency agrees to undertake all reasonable efforts to ensure that none of the UNDP funds received pursuant to the Project Document are used to provide support to individuals or entities associated with terrorism and that the recipients of any amounts provided by UNDP hereunder do not appear on the list maintained by the Security Council Committee established pursuant to resolution 1267 (1999). The list can be accessed via <http://www.un.org/Docs/sc/committees/1267/1267ListEng.htm>. This provision must be included in all sub-contracts or sub-agreements entered into under this Project Document.

IV. AUDIT CLAUSE:

The Audit will be conducted in accordance with UNDP Financial Regulations and Rules and applicable audit policies on UNDP projects.

V. ANNEXES

Annex 1 – Risk Analyses

Risk		Mitigation
It is too difficult to replicate the carbon mitigation (REDD) approach	M	The risk is “moderate” given the novelty of REDD not only in Turkey but throughout the region. The mitigation strategy is vested in the fact that forestry has been chosen as one of the sectors for which the Government has committed to develop a Nationally Appropriate Mitigation Action (NAMAs), in line with its Cancun obligations. Once developed, it will be adopted by the Government. It will contain the baseline and targets for mitigation actions in the forestry sector. This project contributes to this through Outcome I (by developing a necessary policy and institutional prerequisites), but also Outcome II, since it tests concrete mitigation actions in the forest sector. Therefore, this will make the forestry NAMA more realistic – critical if sustainable forest management is to be scaled up.
Difficulties in launching the micro-loan scheme for the solar heating panel, thus undermining efforts to stem wood cutting for fuelwood	M	That project has confirmed acceptance of solar water heating by local villagers in other regions in Turkey, and the risk of non-acceptance in the Mediterranean region is considered low. The technology side of this activity has also been pre-tested through the UNDP supported GEF –funded project on Forest Protected Areas, and therefore, with some sub-regional adjustments, it is believed to be moderately easy to transfer to the Mediterranean region. The project will support: marketing of the scheme to local communities and more importantly, monitoring of contractual arrangements: each transaction will be based on a contract between the Fund and the client, stipulate committing of the recipient to refrain from fuel wood cutting. The project will help set up systems for ensuring compliance.
There exists no post-Kyoto carbon trading regime relevant for forests, especially given the uncertainties of the Turkey’s status.	L	<p>At the moment the risk is assessed as low. The Government of Turkey submitted a request to COP 16 (FCCC/AWGLCA/2010/MISC.8) which reiterated its self-identification as a developing country for the purposes of trading mechanisms. COP-16 confirmed that Turkey is fully eligible for technical and financial support (under relevant COP decisions), as well as for capacity building for the implementation of the Convention. This includes eligibility for support in the development of Nationally Appropriate Mitigation Actions (NAMA), and the Government has identified forestry as one of the priority sectors to be addressed in this regard. With respect to the overall likelihood of REDD after 2012, of all COP-16 outcomes, the outcome on the REDD was the most tangible, and the REDD as a mechanism in post-2012 environment has the highest probability of existence.</p> <p>As a mitigation measure, the design of MRV, NAMA, and other relevant activities pertaining to forest carbon markets will follow the guidance of COP-16 AWC-LCA outcome http://unfccc.int/files/meetings/cop_16/application/pdf/cop16_lca.pdf). Strict observance of the guidance and the engagement of the best international experts in the development of forestry NAMA will minimize the risk that the policies, methodologies, and reporting system emplaced will be dysfunctional after 2012. The NAMA will identify options for forest carbon trading in the unlikely event that REDD is not agreed in the post-2012 climate regime. Non-REDD options include the voluntary carbon markets (which are highly likely to active in case REDD is not formally included in the climate regime), as well as trading under new post CDM/JI mechanisms. Whatever the mechanism, as a party to UNFCCC developing a forest-sector NAMA, Turkey will still require clear forest carbon measurement methodology, MRV, and data-base, meaning that the outcomes of this project will be relevant regardless of the specifics of the post-2012 regime.</p>
Not possible to	L-	The project will engage local communities directly in the design of protected

Risk		Mitigation
positively affect land use and improve the conservation status of land in and around expected protected areas	M	area management plans and plans of activities in the buffer zones. With mediation from experts and NGOs, a careful SWOT analysis will identify those activities which will have win-win nature (i.e. positive conservation effect while not affecting the livelihoods of local people). NTFR and ecotourism will be supported, in partnership with Small Grants Program (Output 3.3). The protected area status and management arrangements will not envisage major restrictions (such as any relocation) for rural livelihoods. However, for ecologically damaging behavior (e.g. fires and logging), agreements will be put in place on collaborative “inspections” (joint PA-community inspections) over the violations. Further reduction in ecologically unsound behavior will come as a result of the deployment of the micro-crediting facility for access to solar heating (Output 2.3).
Climate change risk: forest degradation caused by CC passes the point when the consequences cannot be dealt with through adaptation measures	M	While during the lifetime of the project, the effects of climate change on Mediterranean forests are highly unlikely to be particularly serious, over the longer term climate change is expected to take its toll on the forests. As one symptom, the frequency and severity of fires is projected to increase in the next 50 years. The project is addressing this risk through the shift from reactive to proactive forest management, and particularly through proactive fire management under Component 2. Avoidance of fires vis-a-vis reaction to them, will result in much lower occurrence of fires and will mitigate the climate change impact.

Annex 2: Terms of Reference:

1) Project Manager (PM)

Background

The Project Manager (PM), will be a locally recruited national selected based on an open competitive process. He/She will be responsible for the overall management of the project, including the mobilization of all project inputs, supervision over project staff, consultants and sub-contractors. The PM will be tasked with the day-to-day management of project activities, as well as with financial and administrative reporting. The PM's prime responsibility is to ensure that the project produces the planned outputs and achieves the planned indicators and indicator targets by undertaking necessary activities specified in the project document to the required standard of quality and within the specified constraints of time and cost. This will require linking the indicators to the work plan to ensure Results-Based Management.

The PM will report to the UNDP Turkey CO, Environment and Sustainable Development Programme Officer for all of the project's substantive and administrative issues. The PM will be responsible for meeting government obligations under the project and will perform a liaison role with the Government, UNDP and other UN Agencies, NGOs and other project partners.

Duties and Responsibilities

- Supervise and coordinate the project to ensure its results are in accordance with the Project Document and the rules and procedures established in the UNDP Programming Manual
- Assume primary responsibility for daily project management - both organizational and substantive matters – budgeting, planning and general monitoring of the project
- Ensure adequate information flow, discussions and feedback among the various stakeholders of the project
- Ensure adherence to the project's work plan, prepare revisions of the work plan, if required
- Assume overall responsibility for the proper handling of logistics related to project workshops and events
- Prepare, and agree with UNDP on, terms of reference for national and international consultants and subcontractors
- Guide the work of consultants and subcontractors and oversee compliance with the agreed work plan
- Maintain regular contact with UNDP Country Office and the National Project Director on project implementation issues of their respective competence

- Monitor the expenditures, commitments and balance of funds under the project budget lines, and draft project budget revisions
- Assume overall responsibility for meeting financial delivery targets set out in the agreed annual work plans, reporting on project funds and related record keeping
- Liaise with project partners to ensure their co-financing contributions are provided within the agreed terms
- Assume overall responsibility for reporting on project progress vis-à-vis indicators in the logframe
- Undertake any other actions related to the project as requested by UNDP or the National Project Director
- Provide technical assistance and co-ordination for sustainable forest management criteria & indicators, MRV and NAMA activities, biodiversity integration into forest management plans and carbon monitoring
- Assuring technical co-ordination among consultants to be hired

Qualifications

- Proven management expertise – must be able to fluidly handle the political, technical, and people management challenges that will face the NPM on a daily basis. This is first and foremost the most important qualification.
- A university degree in Engineering, Management or Environmental Sciences or related fields;
- At least 8 years of experience in natural resource management or project/programme management;
- At least 5 years of project/programme management experience;
- Working experience with ministries, national institutions and forestry sector in Turkey;
- Ability to effectively coordinate a large, multi-stakeholder project;
- Ability to administer budgets, train and work effectively with counterpart staff at all levels and with all groups involved in the project;
- Strong drafting, presentation and reporting skills;
- Strong computer skills, in particular mastery of all applications of the MS Office package and internet search;
- Strong knowledge of sustainable forest management issues in Turkey, including the political, institutional and socio-economic contexts;
- Strong knowledge and experience on regional and international forestry strategies, programmes and implementations
- Excellent writing and communication skills in English.

2) Project Associate (PA)

Background

The Project Associate (PA), will be a locally recruited national selected based on an open competitive process. He/She will report to Project Manager (PM) and assist the PM in the coordination of the UNDP-GEF project. S/he will oversee support activities in project implementation including procurement, recruitment and operations logistics. S/he will assess support requirements against project objectives and operating environment.

Duties and Responsibilities

- Assist the PM in managing the project staff
- Coordinate the project experts and ensure that their results are delivered on time
- Prepare GEF quarterly project progress reports, as well as any other reports requested by the Executing Agency and UNDP
- Act as PM in case of his/her absence
- Overall, provide all necessary support to the PM in implementation of the project
- Provide general administrative support to ensure the smooth running of the PMU
- During the visits of foreign experts, manage their visa support, transportation, hotel accommodation etc
- Monitor the use of non-expendable equipment (record keeping, drawing up regular inventories)
- Arrange duty travel
- Perform any other administrative duties as requested by the PM
- Provide technical assistance and co-ordination for capacity building activities on carbon-focused forestry activities and sustainable forest management
- Assisting PM for technical co-ordination among consultants to be hired

Qualifications

- University degree in Engineering, Management or Environmental Sciences or related fields;
- 6 years of experience in the area of project management at medium and small scale
- Solid experience of planning and reporting on foreign funded projects;
- Good secretarial skills and good organizational capacity;
- Knowledge in administrative procedures of the Government
- Good computer skills in common word processing (MS Word), spreadsheet (MS Excel), and accounting software.
- Appropriate English and Turkish language skills, both spoken and written.

2) Project Finance and Procurement Officer (PFA)

Background

The Project Finance and Procurement Officer (PFO), will be a locally recruited national selected based on an open competitive process. He/She will report to Project Manager (PM) and assist the NPM in the coordination of the UNDP-GEF project in terms of financial matters. S/he will be responsible for administering the GEF projects in terms of ensuring full compliance with applicable financial rules as well as procurement and contracting rules, keeping the accounts and doing the financial reporting of all financial transactions in coordination with the UNDP ESD Program Manager and NPM and in specific for the compilation of all the relevant UNDP and GEF financial reports.

Duties and Responsibilities

- Assist the NPM in managing the administrative and finance staff and ensure that all information is accurate
- Provide logistical support to the NPM and project consultants in conducting different project activities (training workshops, stakeholder consultations, arrangements of field visits, etc.)
- Organize control of budget expenditures by preparing payment documents, and compiling financial reports
- Ensure financial monitoring/accounting and account reconciliation mechanisms are in line with GEF and UNDP reporting requirements.
- Maintain the project's disbursement ledger and journal
- Perform any other financial duties as requested by the PM
- Organize and coordinate the procurement of services and goods under the project
- Under supervision of the NPM, be responsible for all aspects of project financial management

Qualifications

- A university degree in social or natural sciences, administration, international relations, statistics, economics, business administration, management planning or related fields.
- Full proficiency in English and Turkish.
- Excellent command of office software, such as word processors, spreadsheets, databases.
- At least 6 years of proven experience in the relevant field.
- Minimum 3 years specialized experience strong accounting and financial reporting background.
- Good knowledge of computer software's such as MS Project and other relevant financial/administrative monitoring tools.
- Proven experience in administration, programme planning, monitoring and reporting.

VI. ADDITIONAL ANNEXES:

Annexes F, G, I and O are attached as separate files to the project document. Rest of the mentioned annexes are available below.

- B - Responses to Project Reviews (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF)
- C - Consultants to be hired for the project using GEF resources
- F - Site data sheets (see separate Word file)
- G - Tracking tool for biodiversity (see separate spreadsheet file)
- H - Composition and draft job description of the LULUCF unit to be established
- I - Tracking tool for climate change mitigation (CCM) (See separate Excel files)
- J - Sustainable tourism and non-wood forest resource opportunities for communities residing in or around protected areas
- K - Developing a system for monitoring, reporting and verification (MRV) for Turkey's carbon projects in the forest sector
- L - Incorporation of gender aspects in the project
- M - Specifics of the solar energy revolving scheme
- N - Framework for development of a revenue-sharing mechanism for carbon credits
- O - Carbon benefit calculations in details (MS Excel documents)
- S - Details of GDF co-financing
- T – Initial workplan and budget with budget details (See separate Excel files)

Annex B: Responses to Project Reviews (from GEF Secretariat and GEF Agencies, and Responses to Comments from Council at work program inclusion and the Convention Secretariat and STAP at PIF)

Comment	Response
<i>GEF Secretariat at the time of PPG approval</i>	
<p>The details about the microcredit scheme are very important. Please note that "Finance for baseline activities is included [as co-financing only] when such activities are essential for achieving the GEF objectives and are managed as an integral part of the same project, which would be described in the project document;" (GEF/C.20/6, Co-financing, para. 14a). If the micro-credit activity does not meet this definition, then it should not be used as co-financing. Please be clear about this at time of CEO endorsement.</p>	<p>The support to the alternative energy generation in forest-rich districts covered by the project is essential for achieving the goal of making forest use more sustainable. The details of the scheme have been elaborated in detail and are presented in Annex M. As clarified previously, US\$ 200,000 of incremental CCM-3 funding is required from GEF to support the micro-crediting solar energy scheme, introduced by the project under Output 2.3. The funding is required for marketing, assistance in the roll-out of the scheme in the target districts and monitoring of ecological success. Government co-financing, consisting of the capitalization of the fund itself, does meet the requirements specified by the GEF. Please refer to Annex M for further details.</p>
<p>In terms of the cost-effectiveness for pest centers, further consideration of relative cost-effectiveness and benefits is needed, which would logically take place during the PPG stage. By CEO endorsement, please refine the information about cost-effectiveness and benefits of the pest centers.</p>	<p>Cost effectiveness of the overall project is analyzed in Section B.6, with special attention paid to the pest control component. Carbon benefits from the pest control component as a whole are estimated to be substantial, at 30,187 tons CO₂ per year and 603,754 tons CO₂ over a 20-year time frame. This includes benefits gained within the target forest districts alone but does not included benefits associated with other areas which the pest centers in particular will inevitably serve, but which are more difficult to quantify. The latter, if included, would further lower unit costs of reduced carbon emissions. It should also be clarified that since this project follows a multiple-benefits approach, pest is an important threat to tackle not only from the climate perspective, but equally from the biodiversity perspective. Therefore, the investment made by GEF should be compared not only to the benefit derived in climate change areas, but also in the biodiversity areas. When biodiversity value factored in, this further minimizes the marginal GEF cost value and makes the investment in the pest centers ever more cost-effective.</p>
<p>The GEF is developing a policy on safeguards, which many implementing agencies have, and the safeguards will likely include pest management safeguards. Information about the safeguards to be used is also expected at CEO endorsement.</p>	<p>The project has been designed in conformance with minimum standard 5: Pest management, as described in GEF/C.41/11, Draft GEF policy on agency minimum standards on environmental and social safeguard standards. As per the criterion under this standard, through the project, "safe, effective and environmentally sound pest management is promoted and supported". More specifically, GEF support meets the following minimum requirements specified in the draft policy:</p> <p style="padding-left: 40px;">"Promote the use of demand driven, ecologically based biological or environmental pest management practices (referred to as Integrated Pest Management [IPM] in agricultural projects and Integrated Vector Management [IVM] in public health projects) and reduce reliance on synthetic chemical pesticides."</p>

Comment	Response
	<p>“Support policy reform and institutional capacity development to (a) enhance implementation of IPM- and IVM-based pest management.”</p> <p>“Disclose draft mitigation plans in a timely manner, before appraisal formally begins, in a place and accessible to key stakeholders including project affected groups and CSOs in a form and language understandable to them.”</p>
<p>For SFM projects, activities are to show carbon benefits. For CEO endorsement, all carbon benefits should be recorded in the tracking tool including for component 3, and methods documented.</p>	<p>Carbon benefits will be generated at five sites arising from six categories of action. Site level benefits and the methods for their assessments are recorded in the site data sheets (see Annex F). They are also provided in the SFM tracking sheets. Carbon dividends generated at the protected areas are included in the SFM tracking tool.</p>
<p>Provide additional details on opportunities for women engagement in the project</p>	<p>Details of women’s engagement in the project are provided in Annex L.</p>
<p>Provide additional details on the socio-economic benefits of the project</p>	<p>Details of socio-economic benefits expected from the project are provided in section B.3</p>
<p>One item to include at time of CEO endorsement is the effect that ecotourism may have on increasing GHG emissions due to travel related emissions, and what will be done to mitigate those emissions.</p>	<p>This impact could not be calculated during the PPG due to the early stages of development of the ecotourism strategy. However, it is not expected to be very significant, given that the aim will be to attract some of the many local and international tourists who are already visiting Turkey’s Mediterranean region, as opposed to generating new, dedicated long-distance trips. Thus, travel distances would be relatively short and would not be expected to have substantial carbon impacts. Nevertheless, as ecotourism strategies are further advanced, this element will be factored into the project’s MRV.</p>
<p>Please provide information on the role of CSO and local communities in particular describing how existing land-users will be involved in determining the mechanism for sharing revenues from sale of future carbon credits and how they may be involved in an MRV</p>	<p>Details on the development of a revenue-sharing mechanism are provided in Annex N.</p>
<i>STAP comments</i>	
<p>Literature and methodologies exist for measurement and monitoring carbon stocks in forests (For example - IPCC guidelines for LULUCF (2003) and AFOLU (2006), GOFC-GOLD, Ravindranath and Ostwald (2008), and others.). Therefore, it is not clear why a specific methodology is required for Turkey, while the global and scientifically accepted methodologies are applicable to different countries and forests types.</p>	<p>The project acknowledges and builds on baseline systems for measuring and monitoring carbon stocks in Turkey and elsewhere and does not attempt to create a completely new one for Turkey. Based on work done during the PPG, it has become clear that instrumental measurements, such as Eddie Covariance, are not needed, and that instead Turkey can rely on the existing system of forest inventory and forest management planning. However, what is needed is to put this all together, i.e. to integrate the LULUCF principles into the forest management planning. This is the essence of the project’s approach to MRV. Additional details are to be found in Annex K.</p>
<p>The GEF funded a project to develop methods, guidelines and toolkits for estimation and monitoring of carbon stock changes or CO2 emissions/removals (Carbon Benefits Project). The methods are being pilot tested, and the results may be available for use in this project. STAP, therefore,</p>	<p>As noted in Annex K, the project did most of the calculations so far in MS Excel software (see Annex O). For the purpose of data organization, maintaining the system, producing and sharing reports, etc. the project is planning to use the web-based software</p>

Comment	Response
strongly encourages UNDP to inquire further about the Carbon Benefits Project with the GEF Secretariat.	developed under the UNEP-GEF Carbon Benefits Project. During the PPG, that project did not yet produce the online module to operate with Tier-2 approaches, but it is expected to be available on-line by December 2012, and so the project team will be trained by UNDP to install and use this system. For more information on the CBP, please see http://www.unep.org/ClimateChange/carbon-benefits/cbp_pim/#
The component on improved tree species management is a long term research objective, requiring decades of monitoring. UNDP may wish to consider the feasibility of such a component.	Tree species management has been removed from the project activities, in part because there was much less opportunity for such activities in the Med. Region (as opposed to Aegean, etc.) due to the limited abundance of deciduous trees.
What baseline methodology will be used to enable Turkey's readiness in future carbon markets and to assist Turkey to develop a series of forest based mitigation projects? Currently, the CDM afforestation and reforestation methodologies are available, and could be considered for the proposed mitigation projects in Turkey. However, it is relevant to note there are no globally accepted methodologies for developing baselines for REDD+ projects. Turkey could adopt these methods when they become available.	Turkey is not currently expecting to be eligible for the REDD+ mechanism per se, although this could of course change. The expectation rather is for a forest sector NAMA, together with credits to be verified and delivered to voluntary carbon markets, which will be worked on in cooperation with the Gold Standard, as further discussed in the project document.
It is commendable that the project has considered the potential impacts of climate change on the forests. Even though climate change may not impact forests during the period of the project, it is desirable to adopt dynamic global vegetation models to assess the impacts of climate change in the short and medium term.	<p>At some point in the near future, as part of Turkey's climate change adaptation work, the impacts of climate change on forests will need to be carefully considered. Indeed, a related set of objectives has been included in Turkey's National Climate Change Action Plan. (see Purpose U01, "Integration of the climate change adaptation approach to ecosystem services, biodiversity and forestry". While Turkey has begun to work in this area, full assessment of CC vulnerability remains incomplete. At present, without detailed knowledge on vulnerability, it is difficult to incorporate any datasets into the forest MRV that would separate climate change as a clear cause of degradation, as distinct from other anthropogenic threats.</p> <p>Given that the project's climate change-related components focus on mitigation rather than adaptation, the longer-term impacts of climate change on Turkey's forests, and the role of dynamic global vegetation models on determination of same, will need to be addressed separately, using appropriate funding.</p>
Council comments	
Switzerland	
The promotion of solar collectors appears to be a key pillar of the proposed strategy in support of reducing the pressure on forests by the rural poor in need of fuel-wood for cooking and heating their homes. If solar energy is used exclusively to satisfy the hot water needs of households (see proposal), however, the demand of fuel-wood for heating and cooking would remain the same. Considering	We have taken this comment into account, and indeed are going to try to expand the use of solar technologies, for use for cooking and heating. Further detailed in this regard are stipulated in Annex M <i>Specifics of the solar energy revolving scheme</i> . While this project is not requesting funding under the Energy Efficiency objectives of the GEF, the importance of energy efficiency is well

Comment	Response
<p>an average demand of 10 to 15 cubic meters fuel-wood per family, how will the demand be met or which alternative would be offered to the use of fuel-wood? Supporting data on the reduction in fuel-wood demand resulting from the proposed use of solar energy are missing. This issue is not mentioned in the risk analysis either.</p> <p>Since the promotion of solar collectors appears to be a key component of measures aimed at the reduction of current fuel-wood demand, the proponent may want to stress the promotion of energy-saving measures on a household level (fuel-efficient stoves, energy-efficient house construction/materials, roof and window insulation etc.) in order to reduce heat loss in winter, hence reducing fuel-wood needs.</p>	<p>recognized. The project will also partner with sister programs of UNDP (such as the Small Grants Program) who will assist in the implementation of energy efficiency programs at the household level in the pilot districts covered by this project.</p>
<p>Although the proposed creation of protected areas within the framework of the project is laudable, protected areas equivalent to IUCN categories 4 and 6 (lowest protection status of multiple use areas) as proposed by the project will add very little to the country's PA system under the CBD. Furthermore, such areas require inter-institutional and multi-stakeholder management due to overlapping jurisdictions and mandates which appears to be insufficiently addressed by the proposal.</p>	<p>Through the creation of new protected forests and raising the capacities of the existing protected areas in the target region, the project is adding almost 80,000 ha of high nature value under-represented forest habitats thus advancing the objectives of the Aichi Targets of the CBD. The selection of the particular IUCN category has many implications, and in Turkey especially, with forests densely populated and traditionally used by forest-dependent communities, care has to be taken to seek conservation solutions which reconcile conservation objectives with human livelihoods in a sustainable way. In this respect national categories of protection which correspond to IUCN IV and VI categories are deemed to be most appropriate, which is common acceptance among the conservationists, Governments and communities in Turkey. As further described above in the discussion of activities under Component 3, the project will help to improve the management planning and conservation capacities while also providing alternative biodiversity non-harmful livelihood opportunities for the local communities. With respect to the multi-faceted jurisdiction, this is well acknowledged and is one of the reasons why the project works not only in the protected areas but also outside: creating buffer zones and corridors and agreeing their status and conservation regimes with local land users is one of the key parameters. In this process the multiple jurisdictions of authorities, communities, and land users will be reconciled.</p>
<p>A brief description and discussion of land tenure (issues) in the target area would be helpful.</p>	<p>The Site Data Sheets in Annex F describe the land use and land tenure status of each area.</p>
<p>The risk assessment proposes "engagement of local people in the design of management plans for protected areas" but fails to address the need for co-management of PAs as a pre-requisite for PA neighbours to develop ownership in conservation.</p>	<p>At the time of preparation of management plans for the new protected forests, the engagement of communities in the upkeep, surveillance and conservation of these areas will play a central role. These arrangements will be formalized through agreements between relevant communities and forest units who manage the protected forests, and this will be key to addressing the said risk.</p>
<p>Please elaborate measures to be taken in context with "proactive pest management".</p>	<p>Output 2.4 in the main text provides the clarification in this respect.</p>

Comment	Response
Please explain how “income sources of local communities will be diversified through sustainable forest management”.	Annex J describes the project’s feasibility study and the proposed activities to support alternative livelihoods of communities residing in or around the high nature value forest areas.
Please explain how “carbon pools in high value forests” will be enhanced; high value forests in ecological or economic terms?	This will be done through Component 3, whereby the forests important in ecological terms are going to be identified and their protection status enhanced. Further details on the activities of Component 3 are contained in the main text of the CEO Endorsement Request.
France	
It should be relevant that GEF Project co-ordinate this activity with FAO regional initiative.	As described under Section B7, Section C and C2, the project fits with the newly signed UNDP Country Program Document for Turkey and contributes to the achievement of the UNDP Outcome 3. The PPG phase has been coordinated with FAO sub-regional office in Ankara, the GIZ-funded regional program “Adapting forest policy conditions to climate change in the MENA region” and Collaborative Partnership on Mediterranean Forests (CPMF) working under <i>Silva Mediterranea</i> of FAO. The GEF project will employ the rich expertise of the GIZ program and the <i>Silva Mediterranea</i> network in the design of policies and tools for multiple-use forest management. It will benefit also from its cooperation with ‘Collaborative Partnership on Mediterranean Forests’ under <i>SilvaMediterranea</i> of FAO which is a multi-country initiative promoting networking among experts and decision making in the Mediterranean forest region where UNDP Turkey is a partner.

Response to GEFSEC Project review dated 11 December 2012			
Questions	Secretariat Comment at PIF WP Inclusion:	Government and UNDP Response	Reflection in PIF
18. Does the project take into account potential major risks, including the consequences of climate change and provides sufficient risk mitigation measures? (i.e., climate resilience)	<p>Agency response was to request for CEO approval stage to include in MRV the effect that ecotourism may have on increasing GHG emissions due to travel related emissions, and what will be done to mitigate those emissions. Agency response is "This impact could not be calculated during the PPG due to the early stages of development of the ecotourism strategy. However, it is not expected to be very significant, given that the aim will be to attract some of the many local and international tourists who are already visiting Turkey's Mediterranean region, as opposed to generating new, dedicated long-distance trips. Thus, travel distances would be relatively short and would not be expected to have substantial carbon impacts. Nevertheless, as ecotourism strategies are further advanced, this element will be factored into the project's MRV." However, there is no reference to this in the Annex K on the MRV. Please add this to the description of the MRV in Annex K.</p>	<p>Thank you for this comment. We have added the following text to Annex K:</p> <p>6.7 Accounting for, and mitigating for, emissions from tourism in the forestry sector (especially in protected areas)</p> <p>Under this activity, this MRV will not be used to provide information on emission from tourism in forests, that would be fed to national reporting to UNFCCC. This is so in order to exclude double counting, since emissions from tourism (both domestic and international tourists while inside the country) visiting by road transport is accounted for under UNFCCC Reporting Subcategory Transport – Road Transport, while emissions related to air travel of domestic tourisms is accounted for under UNFCCC Reporting Subcategory Transport – Air Transport. International air travel of tourisms is accounted for by those countries who maintain the fleet of the carriers who bring in the international tourists to Turkey.</p> <p>While because of double counting this information is not going to be separately reported at the national scale, at the same time, information on forest tourist travel emission, if segregated could represent an estimate of the carbon footprint, and if found substantial, would require appropriate mitigation actions by the forest sector to offset them.</p> <p>As of 2013, this impact cannot be calculated with precision since the Ecotourism Strategy of the General Directorate of Forestry has not been finalized and launched and it is not possible to forecast the levels of growth in the tourist inflows. The Tourism Strategy of the General Directorate of Forestry is expected to be finalized by 2014, and will then make available a picture on the tourism loads. Based on that, the forest-sector MRV will assess the impact of forest tourist travel impact with precision, comparing the baseline (as of the date of adoption of the Tourism Strategy) and 10 years from baseline under growth scenario (as will be forecasted by the Strategy). This will be done at some point in 2014-2015. Since there is no single IPCC approved methodology to assess emission from tourism travel, specifically in forests, the MRV will rely on one of the advanced international assessment methods and approaches, such as those referred to in the links below:</p> <ul style="list-style-type: none"> Climate Change and Tourism – Responding to Global Challenges, WTO, UNEP, 2008 (http://www.unep.fr/shared/publications/pdf/WEBx0142xPA-ClimateChangeandTourismGlobalChallenges.pdf) 	Annex K

		<ul style="list-style-type: none"> • Measurement of CO2 emissions from ecotourism in Malaysia http://scialert.net/qredirect.php?doi=jas.2012.1832.1838&linkid=pdf • Peeters, P. et al. (2007a), 'Air Transport Greenhouse Gas Emissions', in P. Peeters (ed.), <i>Tourism and Climate Change Mitigation – Methods, Greenhouse Gas Reductions and Policies</i> (pp. 29–50), NHTV Academics Studies, No. 6, NHTV, Breda University, Breda. <p>Based on this or other appropriate assessment, adapted to Turkey, in case the annual growth in emissions from tourism along the trajectory of going from baseline to the 10 years away from baseline (as forecasted by the Ecotourism Strategy), exceeds the established UNFCCC negligence interval, a series of mitigation measures would be proposed under the Forest Sector National Appropriate Mitigation Action (NAMA), primarily (1) forest plantations, (2) introduction of electric cars in forest parks and similar sustainable transport measures, and (3) expanded use of solar technologies in forest park facilities, and (4) improvements in energy efficiency. Detailed plans for these will be developed in the NAMA and approved by Government</p>	
25. At PIF: comment on the indicated co-financing; At CEO endorsement : indicate if confirmed co-financing is provided.	Confirmation of co-financing amount is not apparent.	We have revisited all co-financing arrangements. We can confirm that all co-financing has been certified in a standard way by securing letters from relevant co-financiers. These are all attached in one .pdf file submitted on 26 November. Each letter identifies: (1) name of co-financier, (3) activities which the co-financing is going for, (4) type (cash or in-kind), (5) amount, and (6) signature or stamp of the authorized official. The letters have been obtained through official communications between UNDP and the co-financing agencies and the project activities have been planned with due account of both GEF and co-financing amounts.	Section C.1
27. Have the appropriate Tracking Tools been included with information for all relevant indicators, as applicable?	Dec 11, 2012 UA NR: The BD tracking tool needs to be fully completed and resubmitted. Please select a score in each line instead of the dashes.	We have corrected the METT Scorecards accordingly.	METT Scorecard resubmitted

Annex C: Consultants to be hired for the project using GEF resources

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
For Project Management (only local/no international consultants)			
Project Manager (PM) (SC9-3)	1,350	104	<p>Supervise and coordinate the project to ensure its results are in accordance with the Project Document and the rules and procedures established in the UNDP Programming Manual</p> <p>Assume primary responsibility for daily project management - both organizational and substantive matters – budgeting, planning and general monitoring of the project</p> <p>Ensure adequate information flow, discussions and feedback among the various stakeholders of the project</p> <p>Ensure adherence to the project's work plan, prepare revisions of the work plan, if required</p> <p>Assume overall responsibility for the proper handling of logistics related to project workshops and events</p> <p>Prepare, and agree with UNDP on, terms of reference for national and international consultants and subcontractors</p> <p>Guide the work of consultants and subcontractors and oversee compliance with the agreed work plan</p> <p>Maintain regular contact with UNDP Country Office and the National Project Director on project implementation issues of their respective competence</p> <p>Monitor the expenditures, commitments and balance of funds under the project budget lines, and draft project budget revisions</p> <p>Assume overall responsibility for meeting financial delivery targets set out in the agreed annual work plans, reporting on project funds and related record keeping</p> <p>Liaise with project partners to ensure their co-financing contributions are provided within the agreed terms</p> <p>Assume overall responsibility for reporting on project progress vis-à-vis indicators in the logframe</p> <p>Undertake any other actions related to the project as requested by UNDP or the National Project Director</p> <p>Assuring technical co-ordination among consultants to be hired (see details at list of consultants for Technical Assistance)</p>
Project Associate (PA) (SC6-2)	625	130	<p>Assist the PM in managing the project staff</p> <p>Coordinate the project experts and ensure that their results are delivered on time</p> <p>Prepare GEF quarterly project progress reports, as well as any other reports requested by the Executing Agency and</p>

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
			<p>UNDP</p> <p>Act as PM in case of his/her absence</p> <p>Overall, provide all necessary support to the PM in implementation of the project</p> <p>Provide general administrative support to ensure the smooth running of the PMU</p> <p>During the visits of foreign experts, manage their visa support, transportation, hotel accommodation etc</p> <p>Monitor the use of non-expendable equipment (record keeping, drawing up regular inventories)</p> <p>Arrange duty travel</p> <p>Perform any other administrative duties as requested by the PM</p> <p>Assisting PM for technical co-ordination among consultants to be hired (see details at list of consultants for Technical Assistance)</p>
Project Finance and Procurement Officer (PFO) (SC9-1)	925	212	<p>Assist the PM in managing the administrative and finance staff and ensure that all information is accurate</p> <p>Provide logistical support to the PM and project consultants in conducting different project activities (training workshops, stakeholder consultations, arrangements of field visits, etc.)</p> <p>Organize control of budget expenditures by preparing payment documents, and compiling financial reports</p> <p>Maintain the project's disbursement ledger and journal</p> <p>Perform any other financial duties as requested by the PM</p> <p>Organize and coordinate the procurement of services and goods under the project</p> <p>Under supervision of the PM, be responsible for all aspects of project financial management</p>
<p>Justification for office facilities, equipment, vehicles and communications; miscellaneous; and travel for project management:</p> <p>USD 28,350 has been allocated to the acquisition of 4 computers, office furniture, and 4 telephone for the project management unit</p> <p>USD 1,500 has been allocated over the 5 years for office stationery</p> <p>USD 52,400 has been allocated to management-related travel to project sites undertaken by the project management unit</p> <p>USD 100,000 has been allocated to organize local and national administrative meetings and workshops.</p>			
For Technical Assistance			
Local			
Project Manager (PM) (SC9-3)	1,350	156	<p>For NPM, remaining of his/her time (60%) will be allocated to technical coordination of Output 1, Output 2 and Output 3 to assure technical cooperation and balance among climate change (Output 2) and biodiversity (Output 3) outcomes. S/he will prepare technical parts of the terms of references and will support M&E expert on technical</p>

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
			evaluation, as well. NPM will provide technical assistance and co-ordination for sustainable forest management criteria & indicators, MRV and NAMA activities, biodiversity integration into forest management plans and carbon monitoring.
Project Associate (PA) (SC6-2)	625	130	For PA, remaining of his/her time (50%) will be used for technical coordination of outputs. S/he will coordinate knowledge management via organizing technical information/reports/knowledge products. S/he will provide technical assistance and co-ordination for capacity building activities on carbon-focused forestry activities and sustainable forest management.
Project Finance and Procurement Officer (PFO) (SC9-1)	925	48	For PFA, remaining of his/her time (18%) will be used for micro-crediting programme to be applied under Outcome 2.3. and Outcome 3.3. S/he will make financial and administrative assurance of allocation of micro-credits from GDF to sites in line with the project aims.
LULUCF expert	2,500	42	Local LULUCF expert will provide technical expertise on activities below in collaboration with international LULUCF expert:
			- Technical support to build capacity of the LULUCF unit (national and international)
			- Monitoring of change in fuelwood consumption profiles of forest households (monitoring methodology will be developed; ex ante and ex post public surveys will be conducted)
			- Data collection for carbon stock and stock change measurements.
			- Development of LULUCF database integrated into ORBIS, via improving ENVANIS and to transfer data collected (2.5.1.)
			- Preparation of carbon protocols which will be used for carbon calculation before, during and after the implementation of enhancement and mitigation activities.
			- Revision of Carbon Account Calculations at the end of the project (5th year of the project)
Micro-credit expert	2,500	22	Micro-credit expert, in collaboration with Project Finance and Procurement Officer, will provide technical expertise on activities below:
			- Marketing of the scheme (introduction of the project, raising public awareness in the pilot sites through dissemination meetings regarding the microcredit)
			- Assistance in roll out in target districts (Identification of the villages; Collection of the applications from the identified villages; evaluation of the applications; identification of the households to be credited in respect to

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
			the budget constraints; budget is released)
Integrated Pest Management (IPM) Expert	1,250	118	Local IPM expert will provide technical expertise on activities below in collaboration with international IPM expert:
			- A comprehensive study of the existing forest pests in project areas (species, their spreading, biology and natural enemies)
			- Training technical staff in IPM activities
			- Examining the written records of the areas damaged by the economically harmful species inhabiting these forests in recent years on year-on-year basis, as well as identifying and mapping the risk areas according to old data and new data to be recorded for each year, establishing the ecological and silvicultural reasons behind the harm caused by species in these areas.
			- Updating pest announcement forms and setting up software and database of integrated pest management system
			- Implementing the possible silviculture activities to reinforce natural control for pest damage
			- Establishing two laboratories (1 in Western Med Forest Research Institute and 1 in Eastern Med Forest Research Institute) in order to produce natural enemies for biological control and a training department for the staff working in this field
GIS expert	1,250	14	- Establishing an early-warning system for pest control
			GIS expert will work in collaboration with several national and international experts to support the PMU with maps, data and layer management about activities below:
Policy expert	1,250	12	- Remote sensing and satellite images to enable carbon monitoring for fire and pest outbreaks in the pilot sites
			- Development and approval of regulatory revisions to enable creation of protected forest status for high conservation value forests including Climate Change and Biodiversity purposes
Sustainable Forest Management (SFM) expert	1,250	88	SFM expert will lead and facilitate activities below with related national and international experts:
			- Methodology on accounting for multiple benefits arising from Turkey's forests developed (by means of SFM C&I - detailed studies will be undertaken in 5 pilot sites under Component 2 to be replicated to Turkey)
			- Development of, printing and dissemination of training toolkit for integrated forest

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
			management including climate change mitigation and biodiversity conservation as a knowledge product.
			- Exchange of technical knowledge and experience among Mediterranean climate realm for integrated forest management including climate change mitigation and biodiversity conservation - Building capacity of GDF officials through participating to international meetings for experience sharing at regional and international level
			- Integration of carbon accounting system into forest management plan in 5 pilot sites
			- Integration of landscape approach into forest management planning scheme to be replicated in Turkey with lessons learned from 5 pilot sites
MRV and Carbon Accounting expert	2,500	31	Local MRV expert will provide technical expertise on activities below in collaboration with international MRV and Carbon Accounting Expert:
			- Setting MRV framework for the Turkish IFM/AR situation
			- Development of a Project Design Document (PDD)
			- Selection and modeling of carbon accounting Methodology
			- Registration
NAMA expert	2,500	14	Local NAMA expert will provide technical expertise on activities below in collaboration with international NAMA Expert:
			- Assessment of Current Situation for Development of NAMA
			- Scoping NAMA and Development of Methodology
			- Development of a Road Map with short and medium term milestones for NAMA preparation
			- Identification of enabling activities for setting the national structure on implementation of NAMA
Integrated Fire Management (IFM) expert	1,250	80	Local IFM expert will provide technical expertise on activities below in collaboration with international IFM Expert:
			- Preparing and introducing fire prevention programme including public awareness campaigns, education programs, seminar and trainings for local communities and general public, as well as producing videos, pamphlets, posters, interactive boards at 5 pilot sites for 5 years.
			- Enhancement of fire preparedness programme including training at national and local level, fuel and fire breaks, decision support and early warning system and wildfire operating plan specific to forest

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
			enterprise directorate with collaboration between responsible authorities to ensure cost effectiveness.
			- Reducing incidence of crown fires by 50% through mitigation programs involving training at national and local level with forest enterprise directorate level implementations such as thinning, tending and mastication thereby converting live or dead standing biomass into surface fuel.
			- Enhancement of suppression programme via training at national and local level to assure effective use of resources.
			- Supporting national level integrated fire management system including fire danger rating component with demonstration activities at 5 pilot sites.
Silviculture expert	1,250	80	Local Silviculture expert will provide technical expertise on activities below in collaboration with international IFM Expert:
			- Knowledge sharing on carbon focused silviculture implementations at best practice examples
			- Carbon-focused thinning implemented at 5000 ha (1000 ha per site)
			- Rehabilitation of Degraded Forests in pilot sites (increasing crown cover from 10% to 50%)
Plantation expert	2,500	25	- Designing, site selecting, implementing, monitoring and reporting of plantation activity to be undertaken to increase carbon stock in 5 pilot sites at 1200 ha
International			
Evaluation Experts (mid-term and final evaluations)	2,500	8	The international evaluation expert will lead the mid-term and the final evaluations. He/she will work with the local evaluation consultant in order to assess the project progress, achievement of results and impacts. The expert will develop a draft evaluation report, discuss it with the project team, government, and UNDP, and as necessary participate in discussions to extract lessons for UNDP and GEF. The standard UNDP/GEF project evaluation TOR will be used.
LULUCF expert	3,000	10	International LULUCF expert will lead to undertake activities below with national LULUCF expert:
			Outcome1: Technical support to build capacity of the LULUCF unit (national and international)
			Outcome2: Development of LULUCF database integrated into Forest Information System (FIS), via improving ENVANIS and to transfer data collected
			Outcome2: Preparation of carbon protocols

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
			which will be used for carbon calculation before, during and after the implementation of enhancement and mitigation activities.
			Outcome2: Integration of carbon accounting system into forest management plan in 5 pilot sites
			Outcome2: Revision of Carbon Account Calculations at the end of the project (5th year of the project)
			Outcome2: Monitoring of change in fuelwood consumption profiles of forest households (monitoring methodology will be developed; ex ante and ex post public surveys will be conducted)
MRV and Carbon Accounting expert	3,000	12	International MRV and Carbon Accounting expert will lead activities below with national MRV expert:
			Outcome1: Setting MRV framework for the Turkish IFM/AR situation
			Outcome1: Selection and modeling of carbon accounting Methodology
			Outcome1: Development of a Project Design Document (PDD)
			Outcome1: Registration
NAMA expert	3,000	15	International NAMA expert will lead activities below with national NAMA expert:
			Outcome1: Assessment of Current Situation for Development of NAMA
			Outcome1: Scoping NAMA and Development of Methodology
			Outcome1: Development of a Road Map with short and medium term milestones for NAMA preparation
			Outcome1: Identification of enabling activities for setting the national structure on implementation of NAMA
			Outcome1: Supervision of Monitoring and Evaluation Process
Integrated Fire Management expert	2,500	4	Preparing and introducing fire prevention programme in collaboration with national Integrated Fire Management Expert.
Silviculture expert	2,500	4	Providing international expertise, knowledge, hands-on trainings and implementation techniques on carbon-focused silviculture activities in line with biodiversity targets.
Integrated Pest Management expert	2,500	4	Providing international expertise, knowledge, hands-on trainings and implementation techniques on integrated pest management in line with GEF safeguards.
Non-wood forest products and value chain expert	2,500	7	Enhancement of NWFP in 5 FED (including value chain and harvest plans)
			Establishing partnership (guidance and encouragement) between 5 FED and local communities including NGOs and private sector to benefit from micro-credit programme.

Position Titles	\$/ person week	Estimated person weeks	Tasks to be performed
<p>Justification for GEF resources allocated to travel costs: The project has 5 pilot sites at which the project strategy is going to be implemented. Frequent visits to the pilot sites by project experts, specialists and the management unit are going to be critical. The site visits will also be central to informing the discussion on criteria and methodology for multiple-benefits of forests and integrating landscape approach into management plans. There will be also some international visits to increase knowledge sharing and networking at Mediterranean scale. In addition, frequent visits for monitoring project results are also going to be important. The allocation of GEF resources to travel, including Project Management Unit's travels is USD 928,110 for 5 years.</p>			

Annex H: Composition and draft job description of the LULUCF unit to be established

Three kinds of expert should be employed in the LULUCF unit:

- 1- An expert on remote sensing technology who is also familiar with GIS
- 2- An expert on forest inventory and management planning system used in Turkey
- 3- An expert on MRV, LULUCF's and AFOLU's GHG calculation process given in IPCC guidelines

Area of expertise	Responsibilities within the unit	Qualifications
Remote sensing technology	Determination of land use forms defined in GPG-LULUCF manual, and annual land use changes in the planning units.	1- Forest Engineer with 5 years professional experience. 2- Master of science degree in remote sensing and GIS technology.
Forest Inventory and Management Planning	Carbon stock and stock change calculations on the land use forms by means of the methodologies given in the guidelines prepared by IPCC such as GPG-LULUCF and AFOLU manuals.	1-Being Forest Engineer having 5 year experience. 2- Having master science degree on forest and natural resource inventory, and, management planning practice 3-Being familiar to IPCC guidelines especially on LULUCF and AFOLU
MRV, LULUCF and AFOLU	1-Maintenance of the MRV created by the project, 2-Carbon stock and stock change calculations on the land use forms by means of the methodologies given in the guidelines prepared by IPCC such as GPG-LULUCF and AFOLU manuals. 3-Preparation of annual NIRs and CRF on GHGs to present UNFCCC together with the other experts in the unit. 4-Representation of Turkey in the COP meetings. 5-Project preparation on climate change and NAMA for benefitting carbon markets	1-Being Forest Engineer having 5 year experience. 2- Having Master Science (or Ph.d) degree on remote sensing and GIS technology. 3-Being familiar to NIR and CRF preparation 4-Being familiar to Carbon Markets and NAMA project preparation 5-Good skill in English

- 1- **Tasks related to this project:** Teaching and training of the forest engineers chosen from the management planning groups and forest regions.
- 2- **Long-term responsibilities:** (1) Preparation of the annual NIRs and CRF tables to present to UNFCCC, (2) project preparation on climate change and NAMA for benefitting carbon markets, and (3) representing Turkey in the COP meetings organized by IPCC or the other international organizations such as IUFRO, FAO, GEF, UNDP.

Annex J: Sustainable tourism and non-wood forest resource opportunities for communities residing in or around protected areas

As mentioned in the risks table, protected areas establishment might be perceived to result in some degree of forsaken traditional land use as well as lost forestry employment and benefits, forest villagers would conceivably anticipate new forms of compensation. In order to “win them over” in favor of the project, new streamlined financial support modes as well as possible carbon revenues will need to be introduced to them realistically, i.e. in line with local conditions, expectations and forsaken opportunities. Among the options for such compensatory actions appear to be non-wood forest products and, though to a lesser degree ecotourism. Both options are examined below.

Non-wood forest products

An important socio-economic benefit to be expected through this project is the streamlined as well as extended system of support through partnerships for non-wood forest products (NWFP) management and eco-tourism established between pilot site forest administration and local communities, mediated by local community-based organizations (e.g. FORCOOP) and NGOs, in collaboration with ORKÖY’s micro-crediting program and UNDP’s Small Grants Program.

NWFPs are well known to hold great income generation potential in Turkey, and the southern, i.e. Mediterranean, region of the country is the pre-eminent in this respect. However, there is apparent lack of quantitative knowledge regarding the degree to which this high potential is actualized, i.e. how large the sector is. This is essentially due to the current mode of NWFP management.

Normally, the General Directorate of Forests (GDF) announces every year a list of NWFP names and descriptions that may be legally collected from the state forest lands by forest cooperatives and villagers. The villagers then collect the listed NWFP; bring and report to the State Forest Enterprises (SFEs) the NWFP they have collected; and make payments to the SFE in accordance with the listed official unit fees and the quantities collected. The official fees that the villagers pay for the collected NWFP are basically “token payments” (e.g., a couple of cents a kilo for certain leaves and herbs). This procedure is carried out in accordance with the Articles 37 and 40 of Forest Law 6831.

In most cases, NWFPs collected and paid for to SFEs by forest communities are subsequently purchased from the villagers or cooperatives by middlemen, who then sell the NWFP to retailers, wholesalers or exporters. The middlemen tend to pay several times higher than the “token fees” which villagers and cooperatives pay to SFEs. However, retailers and wholesalers as well as exporters can easily buy NWFP from the middlemen at prices several times higher than what the middlemen pay to forest people. Hence, middlemen and further sellers tend to get the lion’s share of profits, as opposed to the token fees forest administration takes and the modest revenue that forest communities gain. Nonetheless, the true extent or limits of variation in NWFP revenue sharing between forest communities, the middlemen and further sellers (i.e., retailers, wholesalers and exporters) cannot be ascertained because the only systematically recorded data as to NWFP utilization consists of the token fees forest people pay to SFEs, and the foreign trade data.

Table J-1 shows official annual token-fee sales of NWFP by individual forest villagers and forest cooperatives within the project demonstration sites between 2005 and 2011. As observed at the table, NWFP sales by regional forest administrations to forest communities seem to have rather inconsistent values. We can see a couple of zero values, a very extreme outlier for Köyceğiz in 2010, and several cases of sharp fluctuations over the years. In view of the annually regular adjustment of official token fees, the observed inconsistency and sharp fluctuations ought to be attributed to the recorded quantities NWFP collected by forest people. Yet in any case, the range of monetary values in the table shows that the fees paid by forest people to local forest administrations are truly “token” or symbolic.

Table J-1: Official token-fee sales of NWFP to individual forest villagers and forest cooperatives, 2005-2011, Turkish Lira-TRY

State Forest Enterprise	Year							
	2005	2006	2007	2008	2009	2010	2011	Total
POS	2,970	10,364	4,770	2,850	7,798	5,254	8,895	42,901
GAZİPAŞA	2,595	1,599	2,349	3,449	0	1,300	2,400	13,692
ANDIRIN	1,280	8,944	4,205	0	4,760	9,756	1,920	30,865
GÜLNAR	2,695	2,929	105	2,380	7,324	3,398	10,924	29,756
KÖYCEĞİZ	0	3,818	3,218	49,980	4,024	157,270	11,590	229,899
Total	9,540	27,654	14,647	58,659	23,906	176,978	35,729	347,113

Concerning the income acquired by forest communities through NWFP collection or harvest, one could reasonably reckon pecuniary values several times, if not more than ten times, the figures in Table A6-1 in light of the prices paid by middlemen to forest people. Furthermore, it is a widespread practice that forest villagers report, hence pay for, NWFP far less than what they actually collect or harvest from forest. Such “under-reporting” is overlooked by forest administrations for the good of forest communities. The unreported and unpaid for NWFP are either used for domestic needs or sold to middlemen just like the reported NWFP. Even though the extent of this under-reporting cannot be determined by definition,

the unreported part of NWFP in aggregate is known to be considerably more than the reported and paid-for part in most of the regions.

Reported and unreported picking or harvest of NWFP from state forests thus constitutes a significant means of income generation for forest communities. This is particularly important given the rather incomplete planning and inventory of NWFP as well as the widespread under-reporting of NWFP collection and harvest from the state forests. It is likely that a more complete and inclusive planning and management of NWFP will offer notably increased contributions to the well-being of forest-dependent communities.

In order to realize the further potential of non-wood forest resources in this respect, the project will encourage and organize a coordinated cultivation/management of locally-appropriate NWFP as opposed to passive picking of such products growing in the woods. Intensive management and cultivation of certain non-wood forest products in the state forests especially near forest villages are also recommended in relevant sectoral reports. This proposal is parallel to the current efforts and vision of the GDF Department of Non-wood Forest Products and Services that was established in July 2011. Furthermore, there have been several preparatory meetings that positively evaluated the potential for incorporating NWFP management into regular forest management plans.

Table 2 shows the specific NWFPs that are currently known to hold notable economic potential and are suitable for more intensive management and cultivation in the project's pilot sites. However, the Mediterranean region as a whole has a broader range of non-wood forest products that deserve further assessment as to economic potential for forest communities. Thus, certain other products in addition to those indicated in Table J-2 can be subjected to intensive management and cultivation in state forests near forest villages.

Table J-2: Non-wood forest products having further economic potential in project's pilot sites

State Forest Enterprise	Non-wood forest product (NWFP)
POS	Wild mushroom, thyme, laurel (sweet bay)
GAZİPAŞA	Myrtle, rockrose, sage, laurel (sweet bay)
ANDIRIN	Thyme, laurel (sweet bay)
GÜLNAR	Rockrose, thyme
KÖYCEĞİZ	Laurel (sweet bay), thyme

Improved management of NWFP requires cooperation with the new Department of Non-wood Forest Products and Services at GDF. Moreover, ORKÖY's "economic" micro-credits may be conveniently directed to this end. Specifically, ORKÖY can provide low-interest loans to village legal entities (village heads) on behalf of the village community instead of individual households/families. This will be a novelty at least from ORKÖY's perspective, because there has been no practice of micro-credit provision at village community level to date. Due to probable economies of scale, financial support at village level for a streamlined management of NWFPs could be a rational option. Additionally, forest villages (village legal entities and forest cooperatives) can be directed to have recourse to GEF Small Grants Program for this purpose as well. SGP's area of "sustainable forest management" appears to be suitable for applying for streamlined NWFP management in the pilot sites.

Ecotourism

Generally speaking, the project's pilot sites do have some potential for ecotourism-based income generation for forest communities, at least within the project's five-year horizon. Nevertheless, pilot sites in the POS region can still be said to offer limited opportunities that would contribute to the well-being of forest communities within the site. Peculiarity of the POS region is attributable to the Aladağlar National Park southern border of which adjoins the territory of the POS State Forest Enterprise. This peculiar position the POS site can be worth to consider inasmuch as the neighboring Aladağlar National Park attracts many mountaineers, trekkers and hikers.

ORKÖY has occasionally provided micro-credits for forest households that want to turn part of their homes into a boarding house for ecotourists. By this project, this form of support would be streamlined and extended through partnerships between local forest administration and local forest households as well. A new socio-economic benefit would be a combined and more focused support of ORKÖY and UNDP SGP in particularly POS site for promotion of income-generating ecotourism management. The activities to be supported in this respect should go beyond boarding house management such as awareness raising for better livelihood through ecotourism, training and certification of ecotour guiding, which are technically allowed by the relevant regulations. At this stage, the POS SFE in northwestern Adana appears to be most appropriate or primary candidate for this practice since it is adjacent to the Aladağlar National Park.

Annex K: Developing a system for monitoring, reporting and verification (MRV) for Turkey's carbon projects in the forest sector

1. Basic principles of MRV

The present annex reviews the approach to monitoring, reporting and verifying (MRV) of the carbon benefits at the project demonstration sites, as well as the strategy for replicating that approach at larger scales—including Mediterranean-wide as well as eventually for Turkey as a whole. It should be noted that the present document is only a first outline of the MRV. Its full development and deployment first at the GEF project sites and then within the national forestry system of Turkey (for use by the LULUCF Department created by the project) are amongst the key objectives of the present project.

Carbon stock and flux methodologies are important for national reporting to UNFCCC, for NAMA and carbon market projects or for monitoring of carbon stock changes for application of SFM criteria. Generally, for Turkey, the methodologies recommended in the GPG-LULUCF manual—which have been accepted by UNFCCC and FAO—will be used as a basis for measuring reductions in forest degradation and increase and enhancement of carbon stocks, with some infusion of national data. This will represent a combination of Tier 1 and Tier 2 methods, as Turkey has some reliable coefficients for some of the equations which deliver more precise estimates. Since forest management plans are the most important data source in carbon calculations, incorporating the LULUCF manual into forest management plans is a vital project activity.

As mentioned above, the proposed MRV system is based on incorporation of the LULUCF methodology into forest management planning systems. The primary element of the MRV is to determine the spatial distribution (landscape mosaic) of land uses in the target areas and to track their changes. On this basis, calculation of stocks and stock changes in the carbon pools on forest lands will be done by applying a series of equations.

Chapter 4 of the IPCC GPG-LULUCF gives full consideration to the requirements and methodologies for measuring, estimating and reporting activities under Article 3.3 and 3.4 of the Kyoto Protocol (KP). The following steps will be taken in order to calculate the total carbon stock and annual carbon stock changes in the project pilot areas (GPG-LULUCF Manual Chap.4, p.11):

- Definition of “Forest” using numerical values and taking into account national circumstances,
- Definition of afforestation, reforestation and deforestation and specifying these areas in the forest lands,
- Identifying the other land categories,
- Stratification of the total land surfaces of each one of the pilot areas into land categories stipulating their geographic boundaries using forest maps and remote sensing technologies at the beginning and at the end of inventory period; Determining changes in the land categories,
- Estimation of total carbon stocks and annual stock changes and non-CO₂ GHG emissions on the lands identified.

The GEF project will help to build the accurate MRV in that it will enable to take physical measurements for a limited number of representative sample plots in order to come up with more precise coefficients where such are too generic under IPCC Tier 1 or don't exist. These instrumental measurements will then be used for extrapolation onto wider areas, once maps and remote sensing are available.

2. Definition of “Forests” and other categories applicable for Turkey

Forest definition in the IPCC GPG LULUCF manual is based on Marrakesh Accords. According to these, *“forest” is a minimum area of land of 0.05 – 1.0 hectares with tree crown cover (or equivalent stocking level) of more than 10 – 30 per cent with trees with the potential to reach a minimum height of 2 – 5 meters at maturity in situ.* A forest may consist either of closed forest formations where trees of various storey and undergrowth cover a high proportion of the ground, or open forest. Young natural stands and all plantations which have yet to reach a crown density of 10 per cent or tree height of 2 meters will be included into forest lands, The forest area which are temporarily un-stocked as a result of human

intervention such as harvesting or natural causes but which are expected to revert to forest will also be added into forest land (*FCCC/CP/2001/13/Add.1, p.58.*)

Table K-1: Land Cover classification applied in LULUCF and implication in Turkey's legislation

Category	Definitions	
	LULUCF	Turkey
Forest	Land spanning more than 0.5 hectares with trees higher than 5 meters and a canopy cover of more than 10 percent, or trees able to reach these thresholds <i>in situ</i> . It does not include land that is predominantly under agricultural or urban land use.	Same. This definition is accepted as “Productive” forest
Other wooded land	Land not classified as “Forest”, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds <i>in situ</i> ; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.	Same. This definition is accepted as “Non-Productive” or “Degraded” forest
Other land	All land that is not classified as “Forest” or “Other wooded land”.	Same
Other land with tree cover (Subordinated to “Other land”)	Land classified as “Other land”, spanning more than 0.5 hectares with a canopy cover of more than 10 percent of trees able to reach a height of 5 meters at maturity.	Same

Forestlands

- Forestland is determined both by the presence of trees and the absence of other predominant land uses. The trees should be able to reach a minimum height of 5 meters *in situ*.
- Includes areas with young trees that have not yet reached but which are expected to reach a canopy cover of 10 percent and tree height of 5 meters. It also includes areas that are temporarily unstocked due to clear cutting as part of a forest management practice or natural disasters, and which are expected to be regenerated within 5 years.
- Includes forest roads, firebreaks and other small open areas; forest in national parks, nature reserves and other protected areas such as those of Specific environmental, scientific, historical, cultural or spiritual interest.

- Includes windbreaks, shelterbelts and corridors of trees with an area of more than 0.5 hectares and width of more than 20 meters.
- Includes abandoned shifting cultivation land with a regeneration of trees that have, or is expected to reach, a canopy cover of 10 percent and tree height of 5 meters.
- Excludes tree stands in agricultural production systems, such as fruit tree plantations, oil palm plantations and agroforestry systems when crops are grown under tree cover

Other wooded lands

The lands which are not classified as “Forest”, spanning more than 0.5 hectares; with trees higher than 5 meters and a canopy cover of 5-10 percent, or trees able to reach these thresholds *in situ*; or with a combined cover of shrubs, bushes and trees above 10 percent are defined as “Other Wooded Land” in the FRA-2010 and LULUCF document. It does not include land that is predominantly under agricultural or urban land use

The definition above has two options:

- The canopy cover of trees is between 5 and 10 percent; trees should be higher than 5 meters or able to reach 5 meters in situ
- The canopy cover of trees is less than 5 percent but the combined cover of shrubs, bushes and trees is more than 10 percent. Includes areas of shrubs and bushes where no trees are present.

Other wooded land includes areas with trees that will not reach a height of 5 meters *in situ* and with a canopy cover of 10 percent or more, e.g. some alpine tree vegetation types, arid zone, etc.

3. Definitions of afforestation, reforestation, deforestation

Countries ratifying the Kyoto Protocol have to report emissions by sources and removals by sinks of CO₂ and other GHGs resulting from LULUCF activities, namely afforestation (A), reforestation (R) and deforestation (D) that occurred since 1990 according to article 3.3 of the protocol. They also have to report some other activities required for article 3.4, of the protocol such as: forest management, revegetation, cropland management and grazing land management. Definitions of these activities (from the annex of the manual *FCCC/CP/2001/13/Add.1, p.58*) and implications for Turkey are presented below:

“Afforestation” is the direct human-induced conversion of land that has not been forested for a period of at least 50 years to forested land through planting, seeding and/or the human-induced promotion of natural seed sources: Thus, all of the plantation activities which have taken place on non-forested lands (open or Other Wooded Land - OWL) since 1960 at least or, earlier than that year, will be accepted as afforestation in the project areas. Although some attempts were realised before 1960, regular plantation activities on large areas began after 1960 in Turkey. Except some of the forestation activities aimed at erosion control and soil conservation on the open lands mainly, almost all the planted forests have been established in degraded (OWL) forest areas in the country. As a result, only the planted or naturally regenerated areas gained from the non forested open areas since 1960 will be counted as afforestation in the project areas.

“Reforestation” is the direct human-induced conversion of non-forested land to forested land through planting, seeding and/or the human-induced promotion of natural seed sources, on land that was forested but that has been converted to non-forested land: For the first commitment period, reforestation activities will be limited to reforestation occurring on those lands that did not contain forest 31 December 1989. Thus, only the plantation areas younger than 22 years old with regard to the end of the year of 2012 will be accepted as reforestation in the project areas.

“Deforestation” is the direct human-induced conversion of forested land to non-forested land: Forest lands opened for obtaining crop land or settlement areas during the last two decades will be restricted as deforestation in the pilot areas. The forest land used for grazing should also be classified as deforestation activity.

“Revegetation” is a direct human-induced activity to increase carbon stocks on sites through the establishment of vegetation that covers a minimum area of 0.05 hectares and does not meet the definitions of afforestation and reforestation contained here: Revegetation can only take place when the land is forest neither before nor after the transition otherwise it would be afforestation, reforestation or forest management (GPG-LULUCF Manual Chap.4, p.14). Partial tree planting in areas under erosion or landslide control is a good example of this term. Thus, partial tree planting on the areas those are managed for erosion control but not accepted as forest will be restricted as revegetation area in the pilot areas.

“Forest management” is a system of practices for stewardship and use of forest land aimed at fulfilling relevant ecological (including biological diversity), economic and social functions of the forest in a sustainable manner: Forest management can only take place on lands that meet the definition of a forest. This term will cover the lands having the thresholds accepted for forest definition only in the pilot areas. Unless they pass the thresholds required for forest definition, wooded lands consisting of *Laurus nobilis*, *Arbutus spp.*, *Rhododendron spp.*, *Quercus ilex*, and *Quercus coccifera* etc. will not be accepted as forestland in the project areas. Wooded lands having less than 10% crown closure will be classified as other wooded land sub category in the pilot areas.

4. Land classification

Each type of forest land discussed above will be classified into standard LULUCF land-use sub-categories for a further calculation of carbon benefits in the pilot areas, after determining their outer boundaries.

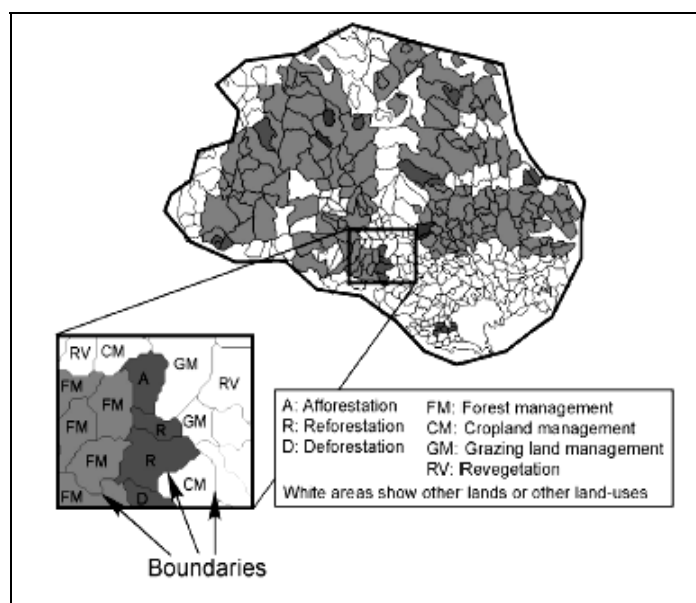


Fig.K-1: An Example for Land Use Sub Categories

The main algorithm which will be applied when classifying the main forest land and the land use sub-categories has three phases as shown below:

- Determining data sources suitable for classification

- Separation of main forest land types and setting of their boundaries

- Dividing the main forest land types into land-use sub-classes as per LULUCF standards.

Multi-phase and multi-source inventory techniques will be applied in the project for the land categories classification. The following will be needed to distinguish among land categories in the pilot areas:

- Satellite images (the six non-thermal bands of the Landsat ETM+ data) acquired in the years of 1990, 2000 and 2012.

- 1 / 100,000 scaled digital forest maps produced by GDF in 1980

Digital topographic maps with 1/25,000 scale belonging to the forest planning units in the pilot areas.

Management maps belonging to the planning units covering the pilot areas constructed 10 years interval

Afforestation maps and reports covering the pilot areas.

Certificates given by the governmental organizations for meadow allocations.

Maps showing wetlands and peatlands.

Thematic maps given in the management plans such as site quality (Forest Productivity Classes), age classes and silvicultural treatments maps covering the forestlands in the pilot areas.

Maps showing protected areas such as national parks, nature reserves and other areas having specific environmental, scientific, historical, cultural or spiritual interest.

Maps produced by TUGEM making use of CORINE technology.

The above documents will be used for monitoring land use changes across the land categories as well as for boundary identification. The first three documents will be supplied by the directorate of Maps and Photogrammetry in the General Directorate of Forestry (GDF). Data requested in items 4 and 8 will be supplied by the Forest Management and Planning Department in GDF. Data relevant to afforestation maps and reports will be given by the Afforestation and Erosion Control Department in GDF. Item 6 will be requested from local managerial units in the forest regions. Items 7 and 9 will be obtained from the General Directorate of Nature Protection and National Parks in The Ministry of Forest and Water Affairs. CORINE maps covering the pilot areas will be requested from TUGEM in the Ministry of Food and Agriculture.

The CORINE (*Coordination of Information on the Environment*) technology, based on interpretation of satellite images is an effective tool for monitoring, accounting and reporting system developed by the European Union in 1985. It provides comparable digital maps of land cover, biotopes (habitats), soils and acid rain for the countries in Europe. Turkey successfully completed CORINE 2000 and participates in CORINE 2006. Experiences have shown that CORINE data are an important baseline but are not sufficient to fulfil all of the requirements of LULUCF reporting process. For example, CORINE has not yet been adapted to meet the needs of the LULUCF National Inventory Reports (NIR). Land cover data obtained by means of CORINE technology therefore still needs to be refined. Methods for integrating CORINE data into LULUCF monitoring, accounting and reporting system will be examined during the project.

The six non-thermal bands of the Landsat ETM+ satellite data acquired in the years of 1990, 2001 and 2012 will be used in the project for precise boundary identification of main forest land types. Digital topographic maps (1:25,000 scales), digital elevation model (DEM) and local forest maps will also used as auxiliary data sources. Pixel-based or segment- based classification approaches might also be used to separate various land categories.

The agricultural tree cover, including citrus, olive, poplar, tea, hazelnut, apple, cherry and peach plantations adjacent to the forest boundaries, can cause confusion for the classification of satellite data. Nevertheless, Landsat ETM+ satellite data can be used in forested regions where agricultural tree plantations are concentrated. Although the orchards consisting of citrus fruits are particularly difficult to discriminate from forest cover using satellite data when compared to other land use forms due to their location together with maquis vegetation consisting of many broad-leaved evergreen shrub species in the Mediterranean region, it is still possible to distinguish forest boundaries (ASAN & OZDEMIR 2004; OZDEMIR et al. 2007). The following process will be adopted in separating the main land categories:

Outer boundaries of the pilot areas on the 1:25.000 scaled topographic maps and satellite images will be determined.

Transferring the forest land boundaries taken from the management maps onto the maps and satellite images.

Separation of the forest land boundaries from the other wooded lands on satellite images will be implemented by means of forest boundaries given in management maps. The other wooded lands under the threshold defined for the forestlands such as agricultural aimed plantations, meadows and grasslands having tree and shrub cover will be determined by subtracting the distinct forest boundaries from total wooded lands.

Grassland boundaries in the areas adjacent to forestlands will be identified through allocated meadow boundaries defined with certificates. These certificates will also be used to determine boundaries between cropland and grassland. Grassland boundaries should be shifted to cropland sides in these cases.

Basic definitions provided in the GPG-LULUCF manual will be adopted when separating wetlands and settlement areas. Peatland boundaries in the wetlands especially will be restricted benefiting from the special maps in the pilot areas.

The satellite images will be the main data source for further separation into the six land-use categories defined in LULUCF manual. Although they are the most suitable data source in this scope, they cannot be used alone efficiently unless they are supported with other sources. Digital forest maps contained in the management plans are the essential data sources to be used in defining forest boundaries in the project. Satellite data will be used as a secondary source here. Images covering pilot areas will be used only for determining the woodlands consisting of agricultural aimed plantations and the other non woodlands, such as meadows, cemeteries, parks, etc. They will be the basic data source for separation of the other land categories however (DEES et al 2003). The maps produced by TUGEM making use of CORINE technology are the best option for separating the other land categories, except main and sub categories of forest lands. Detailed information on adaptation may be obtained in the references ASAN & OZDEMİR 2002 ; ASAN & OZDEMİR 2004; OZDEMİR et al 2005; OZDEMİR et al 2007.

Furthermore, according to LULUCF, forestlands should be divided into sub categories following three phases before beginning total carbon and annual carbon stock changes calculation.

Phase 1: Distribution of forestlands into geographical climate regions.

1. Forestlands in cold-dry climate region
2. Forestlands in cold-wet climate region
3. Forestlands in hot-dry climate region
4. Forestlands in hot-wet climate region

Since the pilot areas were chosen in the Mediterranean Region, 1st. phase may be ignored in the project. Thus, all of the forestland areas in the project can be assumed to be in hot-dry climate region after replacing them on the climate regions map given above.

Phase 2: Distribution of forestlands into main forestland categories.

1. Forestlands remaining forestland
2. Forestlands converted to forestland

According to the basic concept of the LULUCF manual, if a wooded land having the minimum numerical threshold foreseen for the forestland category stays in the same position at least 20 years, it is accepted in the sub category of forestland remaining forestland in the countries existing at temperate zone. Thus, all of the forestlands initiating either artificial or natural regeneration having the ages over 20 years old will be classified in “forestlands remaining forestland” regardless of their origin. Conversely, the forestlands younger than 20 years old and, gained from grasslands, croplands and settlement areas will be classified as “forestland converted to forestland” category.

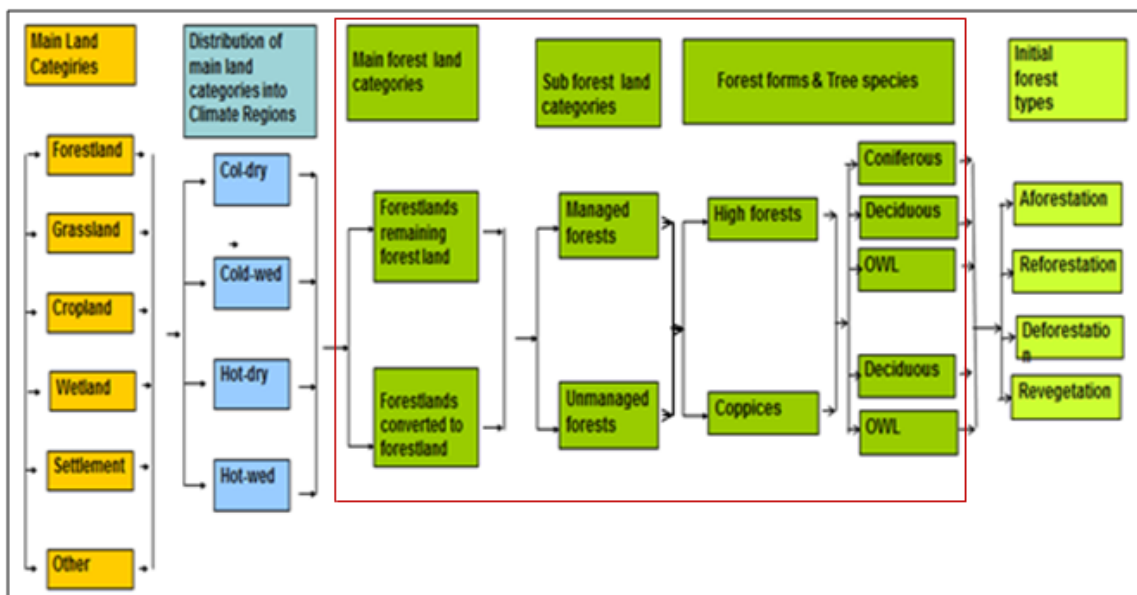
Phase 3: Distribution of forestlands into management and forest forms

1. Managed forestlands
 - Coniferous high forests
 - Afforestation
 - Reforestation
 - Deforestation
 - Coniferous OWL
 - Deciduous high forests

- Afforestation
 - Reforestation
 - Deforestation
 - Deciduous coppices
 - Deciduous OWL
2. Unmanaged forestlands
- Coniferous high forests
 - Coniferous OWL
 - Deciduous high forests
 - Deciduous OWL

The key data sources for Phase 3 include: afforestation maps and reports, thematic maps given in the management plans and the maps showing protected areas such as national parks, nature reserves and the other have specific environmental, scientific, historical, cultural or spiritual interest belonging to the planning units in the pilot areas. The management planning maps showing forest stand types will be basic data sources used for separation of various coniferous and deciduous tree species. It will be focused on OWL areas especially during determination of boundaries between forestland, cropland and grazing land management areas.

The whole process of land classification is summarized in Figure K-2.



5. Determining changes in land-use categories as a basis for determining the stock changes

For the purposes of monitoring reporting and verification of the carbon benefits of the present GEF project, the project team will trace the changes in the land-use and forest state as per categories above three times during the project – in the first year (to reconfirm the baseline), in the middle of the project and in the end of the project. This will enable to trace changes caused by threats (pests, fires, logging), as well as carbon enhancement activities in silviculture and protected areas management.

6. Equations and coefficients used to estimate carbon stocks and changes

The FAO Forest Resource Assessment (FRA) process based on the methodological framework of the IPCC Guidelines for National GHGs inventories Volume 4, chapters 2 and 4 for estimations of biomass and carbon stocks in the countries ratifying UNFCCC and KP is used in this project. Detailed information on this document can be obtained at: <http://www.ipcc-nggip.iges.or.jp/public/2006gl/index.htm> and www.fao.org/forestry/fra FRA-2010 pool categories, and their definitions shown in Table K-3 is being used in estimating the total carbon stocks of the pilot areas (FAO 2008).

Table K-3: Carbon pool categories and their definitions used for estimating total carbon stocks of the pilot areas

Category	Definition
Carbon in above-ground biomass	Carbon in all living biomass above the soil, including stem, stump, branches, bark, seeds, and foliage.
Carbon in below-ground biomass	Carbon in all biomass of live roots. Fine roots of less than 2 mm diameter are excluded, because these often cannot be distinguished empirically from soil organic matter or litter.
Carbon in dead wood	Carbon in all non-living woody biomass not contained in the litter, either standing, lying on the ground, or in the soil. Dead wood includes wood lying on the surface, dead roots, and stumps larger than or equal to 10 cm in diameter or any other diameter used by the country. Minimum diameter for dead wood should be accepted 3 cm for Turkey due to the commercial round wood standardization
Carbon in litter	Carbon in all non-living biomass with a diameter less than the minimum diameter for dead wood (e.g. 10 cm), lying dead in various states of decomposition above the mineral or organic soil. Minimum diameter for dead wood should be accepted 3 cm for Turkey due to the commercial round wood standardization .
Soil carbon	Organic carbon in mineral and organic soils (including peat) to a specified depth chosen by the country and applied consistently through the time series. 1 m. dept will be taken for Turkey conditions

6.1 Estimation of Carbon Stocks in Above and Below Ground Living Biomass

The following basic equations will be used for calculation of above and under ground living biomass and their equivalent carbon stocks in the forests and other woody lands of the pilot areas (FAO 2008, pp.30):

$$AGB = GS \times WD \times BEF_1 \quad (1)$$

$$BGB = AGB \times R \quad (2)$$

Where:

AGB = Above-ground biomass (tons)

BGB = Below-ground biomass (tons)

GS = Growing stock (Volume, m³ over bark)

WD = Basic wood density (Dry weight / green volume expressed in tons/m³)

BEF₁ = Biomass expansion factor (Above ground biomass / stem biomass)

R = Root-shoot ratio (Below-ground biomass / Above-ground biomass)

Carbon content of total living biomass is calculated by using one of the equations given below:

$$CC_{TLB} = (AGB + BGB) \times CF \quad (3)$$

$$CC_{TLB} = [(GS \times WD \times BEF_1) + (GS \times WD \times BEF_1) \times R] \times CF \quad (4)$$

or

$$CC_{TLB} = (GS \times WD \times BEF_1) (1+R) \times CF \quad (5)$$

Where:

CC_{TLB} = Total living biomass (Ton)

CF = Carbon fraction factor

According to the equations given above, growing stock amounts of the tree species in the pilot areas, wood density values and biomass expansion factors, root to shoot ratios and carbon fraction factors are necessary in order to estimate carbon contents of the above ground and below ground carbon pools in the pilot areas. Growing stock amounts will be determined with regard to main and sub forestland categories regarding the areas, stand development areas, crown closure and management of the main tree species.

As mentioned in the introductory parts, the WD and BEF_1 factors used in previous calculations either for NIR or for management plans were based on inadequate biomass studies. Almost all of these studies had been done before the GEF project in locations other than those covered by the project. These coefficients had to be verified through a set of additional desk studies. The new coefficients actually used in the assessments under this project for BEF_1 and WD take into account additional studies by Uğurlu (1976), Sun et al (1980), Durkaya (1998), Saracoğlu (1998 and 2000), İkinci (2000), Özkaya (2004), Asan (2006), Ünsal (2007), Atmaca (2008), Çakıl (2008), Çömez (2010), Tolunay (2010) and As et al. (2001). The coefficients from those studies are summarized in Table K-4. The adjusted coefficients to be used for calculation of present carbon stocks and the annual stock changes in the pilot areas are shown in Table K-5.

Table K-4. Wood density (WD) and Biomass expansion factors (BEF_1) produced by various researchers in Turkey

Tree species	Number of sample trees	Wood density, Ton/ m ³	BEF_1	Reference
<i>Pinus sylvestris</i>	10	0.426	1.242 ± 0.092	Uğurlu 1976
<i>Pinus sylvestris</i>	33		1.198 ± 0.032	Atmaca 2008
<i>Pinus sylvestris</i>	13		1.263 ± 0.050	Tolunay 2010
<i>Pinus sylvestris</i>	55		1.279 ± 0.106	Çömez 2010
Total/ weighted mean	111		1.243 ± 0.086	Tolunay 2010
<i>Pinus brutia</i>	14	0.478	1.225 ± 0.062	Sun et al. 1980
<i>Pinus brutia</i>	33		1.349 ± 0.022	Ünsal 2007
Total/weighted mean	47		1.319 ± 0.064	Tolunay 2010
<i>Pinus nigra</i>	44	0.470	1.071 ± 0.026	Çakıl 2008
<i>Picea orientalis</i>	30	0.358	1.132 ± 0.009	Özkaya 2004
Weighted mean Coniferous	70	0.431	1.222±0,069	Asan 2006
<i>Quercus</i> sp.	32	0.570	1.324 ± 0.157	Durkaya 1998
<i>Fagus orientalis</i>	32	0.530	1.228 ± 0.072	Saracoğlu 2000
<i>Castanea sativa</i>	34	0.400	1.320 ± 0.068	İkinci 2000
<i>Alnus glutinosa</i>	86	0.407	1.103 ± 0.051	Saracoğlu 1998
Weighted mean Deciduous	199	0.550	1.239 ± 0,091	Asan 2006

Table K-5: Wood density (WD) and Biomass expansion factors (BEF_1 & $BEFC_1$) which will be used in the project

Tree species	Wood density, Ton/ m^{-3}	BEF_1	$BCEF_1$	Reference
<i>Pinus sylvestris</i> weighted mean	0,426	1.243 ± 0.086	0.530 ± 0.037	Tolunay 2010
<i>Pinus brutia</i> weighted mean	0,478	1.319 ± 0.064	0.630 ± 0.031	Tolunay 2010
<i>Pinus nigra</i>	0.470	1.071 ± 0.026	0.503 ± 0.012	Çakıl 2008
Weighted mean for other Coniferous	0.431	1.222 ± 0.069	0.527 ± 0.036	Asan 2006
<i>Quercus</i> sp.	0.570	1.324 ± 0.157	0.755 ± 0.089	Durkaya 1998
<i>Fagus orientalis</i>	0.530	1.228 ± 0.072	0.651 ± 0.042	Saraçoğlu 2000
Weighted mean for other Deciduous	0.550	1.239 ± 0.091	0.681 ± 0.045	Asan 2006

The average factors will be accepted as 0.29 for the coniferous, and 0.24 for the broadleaved high forests, and for the productive coppices. The average factors for the OWL should be 0.40 for the coniferous, and 0.46 for the broadleaved non productive high forests. These factors were calculated by Asan (2008) as assessment of the average growing stocks in the productive and non productive high forests and coppices, and are reported in OGM (2006), in Annex Table 5.3 of the FRA 2010 manual during the FRA 2010 studies in Turkey (FRA-2010 Country Report for Turkey 2010/214).

Carbon fraction factors (CF) will be taken as 0,51 for coniferous and 0,48 for deciduous from the Annex Table 5.2 of FAO (2008) given for temperate zone.

6.2 Estimation of Carbon Stocks in Dead Wood Biomass

Carbon stocks in the pool of dead wood biomass consist of dead trees either standing or leaning on the ground, and the woody debris which is the residual of commercial cutting left on the forestlands. Thus, carbon stocks captured by these two sources will be calculated as same as the carbon stock in above ground living biomass. Volume of dead trees are measured by the management planning groups and their amounts are shown in the management plans. Woody debris coming from cutting residuals will be calculated with the help of " f_{BL} " factor. This factor was calculated as 0.19 ± 0.08 by Asan (2006) during the preliminary studies of First National Communication to UNFCCC. Thus, 0.19 value will be used regardless of the tree species for the calculation of woody debris coming from cutting residuals in the project. This factor is also used in the equation Nr 3.2.7 of GPG-LULUCF manual for calculation of carbon lost due to commercial cuttings as shown in the formula given below:

$$L_{\text{cutting}} = V \times WD \times BEF_2 \times (1 - f_{BL}) \times CF$$

Where:

L_{cutting} = Carbon loss due to merchantable cutting

V = merchantable volume amount (m^3)

WD = oven dry matter (ton / m^3)

BEF_2 = biomass expansion factor necessary for conversion of merchantable volume into above ground biomass

f_{BL} = residual ratio

CF = Carbon fraction factor.

6.3 Estimation of Carbon Stocks in Litter

Due to lack of adequate studies, carbon stock in litter biomass was not estimated at the time of the preparation of the first NIR. Yet, later researches made it possible to calculate carbon stocks in litter biomass. Tolunay and Çömez (2007 and 2008) calculated the carbon stocks per hectare in the soil and litter by reviewing all available studies covering 50 years period in Turkey. Litter amounts and the carbon stock accumulating in this pool relevant to tree species is presented in Table K-6.

Table K-6: Litter carbon amounts per hectare in the forests of Turkey (TOLUNAY & ÇÖMEZ 2008)

Tree type	Nr. of Samples	Litter Amount, Ton / ha	Dead Organic Matter, Ton / ha	Littre Carbon, ton / ha
Coniferous	305	21.7 (1.6-115.3)	15.6 (1.1-83.6)	7.8 (0.5-41.8)
Decidious	363	8.2 (1.1-36.6)	6.1 (0.8-18.8)	3.1 (0.4-9.4)
Aforestation (Coniferous)	22	19.0 (0.9-63.2)	14.4 (0.7-50.9)	7.2 (0.3-25.4)
Mixed Coniferous	39	21.3 (2.2-73.5)	13.9 (1.0-52.1)	7.0 (0.5-26.1)
Mixed (Conif.+ Decud.)	10	126.0 (9.4-26.9)	12.8 (16.5-17.8)	6.4 (3.5-8.9)
Mixed Deciduous	264	18.5 (0.7-101.0)	14.2 (0.5-72.9)	7.1 (0.3-36.5)
Average (Weighted)	1003	17.0 (0.7-115.3)	11.7 (0.5-83.6)	5.8 (0.3-41.8)

The following figures from this table will be used as carbon stock per unit area in this project:

For coniferous high forests: 7.8 ton / ha.

For deciduous high forests: 7.1 ton / ha.

For coppice forests and OWL: 3.1 ton / ha.

For afforestation areas: 7.2 ton / ha.

6.4 Estimation of Carbon Stocks in Forest Soil

Tolunay and Çömez (2007 and 2008) calculated the carbon stocks per hectare in the forest soil by reviewing many studies covering 50 years period in Turkey. Carbon stocks accumulating in this pool for relevant tree species are compiled in Table K-7.

Table K-7: Soil carbon amounts per hectare in the forests of Turkey (TOLUNAY & ÇÖMEZ 2007)

Tree Species	Nr. of Samples	Weighted Average, Ton/ha
Coniferous	751	77.1 (0.8-448.0)
Decidious	191	80.4 (2.0-424.0)

Aforestation (Coniferous)	148	83.2 (9.3-316.0)
Mixed Coniferous	97	62.2 (2.5-180.6)
Mixed (Conif.+ Decud.)	33	70.8 (7.0-374.3)
Mixed Deciduous	14	161.4 (96.1-234.4)
Average (Weighted)	1234	78.0 (0.8-448.0)

The following figures from this table are used as carbon stock per unit area in this project:

For coniferous high forests: 77.1 ton / ha.

For deciduous high forests: 80.4 ton / ha.

For afforestation areas: 83.2 ton / ha.

6.5 Estimation of stock changes and GHG fluxes

For the purposes of the nation-wide MRV, which will be adopted for the whole forestry sector in the future based on the results of this project, the estimation of land use changes and the relevant changes in the carbon stocks is envisaged to be done on an annual basis, once the MRV system is fully up and running. Therefore, all the following equations speak about the annual changes in the stocks. However, as previously stated, before the system is deployed, under this project in particular, the land use changes will be traced with precision three times during the life of the project – in the beginning, in the mid-term and at the end. Correspondingly, the changes in the carbon stocks will be traced three times and reported to the GEF accordingly.

Stock changes and carbon fluxes among the carbon pools in the forestlands and OWL's will be calculated with the help of "Gain-Loss" method. Following equations will be used for this purpose:

$$\Delta C_B = \Delta C_G - \Delta C_L$$

Where:

ΔC_B = annual change in carbon stocks in biomass (the sum of above-ground and below-ground biomass) for each land sub-category, considering the total area, tonnes C yr-1

ΔC_G = annual increase in carbon stocks due to biomass growth for each land sub-category, considering the total area, tonnes C yr-1

ΔC_L = annual decrease in carbon stocks due to biomass loss for each land sub-category, considering the total area, tonnes C yr-1

Annual increase in carbon stocks

$$\Delta C_G = G_{TOTAL} = \sum \{I_V \cdot BCEF_1 \cdot (1 + R)\} \text{ (Equation. 2.10)}$$

Where:

G_{TOTAL} = average annual biomass growth above and below-ground, tons d. m. ha-1 yr-1

R = ratio of below-ground biomass to above-ground biomass for a specific vegetation type, in tonne

d.m. below-ground biomass (ton d.m. above-ground biomass)-1. R must be set to zero if assuming no changes of below-ground biomass allocation patterns.

I_V = average net annual increment for specific vegetation type, m³ ha-1 yr-1

$BCEF_1$ = biomass conversion and expansion factor for conversion of net annual increment in volume (including bark) to above-ground biomass growth for specific vegetation type, tonnes above-ground biomass growth (m³ net annual increment). If BCEFI values are not available and if the biomass expansion factor (BEF) and basic wood density (D) values are separately estimated, then the following conversion can be used:

$$BCEF_1 = BEF_1 \bullet D$$

AFOLU (2006) worksheet shown below will be used in the calculation of annual carbon stocks increase either above-ground or under-ground biomass.

Sector		Agriculture, Forestry and Other Land Use						
Category		Forest Land Remaining Forest Land: Annual increase in carbon stocks in biomass (includes above-ground and below-ground biomass)						
Category code		3B1a						
Sheet		1 of 4						
Equation		Equation 2.2	Equation 2.9	Equation 2.10			Equation 2.9	
Land-use category		Subcategories for reporting year	Area of Forest Land Remaining Forest Land	Average annual above-ground biomass growth	Ratio of below-ground biomass to above-ground biomass	Average annual biomass growth above- and below-ground	Carbon fraction of dry matter	Annual increase in biomass carbon stocks due to biomass growth
Initial land use	Land use during reporting year		(ha)	(tonnes dm ha ⁻¹ yr ⁻¹)	[tonnes bg dm (tonne ag dm) ⁻¹]	(tonnes dm ha ⁻¹ yr ⁻¹)	[tonnes C (tonne dm) ⁻¹]	(tonnes C yr ⁻¹)
			National statistics or international data sources	Tables 4.9, 4.10 and 4.12	zero (0) or Table 4.4	G _{TOTAL} = GW * (1+R)	0.5 or Table 4.3	ΔC _G = A * G _{TOTAL} * CF
			A	GW	R	G _{TOTAL}	CF	ΔC _G
FL	FL	(a)						
		(b)						
		(c)						
Total								

Annual decrease in carbon stocks

$$\Delta C_L = L_{\text{wood-removals}} + L_{\text{fuelwood}} + L_{\text{disturbance}} \quad (\text{Equation. 2.11})$$

Where:

ΔC_L = annual decrease in carbon stocks due to biomass loss in land remaining in the same land-use

category, ton C yr⁻¹

L_{wood-removals} = annual carbon loss due to wood removals, tonnes C yr⁻¹ (See Equation 2.12)

L_{fuelwood} = annual biomass carbon loss due to fuelwood removals, tonnes C yr⁻¹ (See Equation 2.13)

L_{disturbance} = annual biomass carbon losses due to disturbances, tonnes C yr⁻¹ (See Equation 2.14)

AFOLU (2006) worksheets shown below will be used in the calculation of annual carbon stock loss due to wood removals, fuelwood gathering and disturbance caused by illicit cuttings, forest fires, pests and disasters. The coefficients as used in the Site Information Forms for various types of disturbances and wood removal at the pilot sites will be used here as well, and this will enable to track the progress.

Sector		Agriculture, Forestry and Other Land Use					
Category		Forest Land Remaining Forest Land: Loss of carbon from wood removals					
Category code		3B1a					
Sheet		2 of 4					
Equation		Equation 2.12					
Land-use category		Subcategories for reporting year	Annual wood removal	Biomass conversion and expansion factor for conversion of removals in merchantable volume to total biomass removals (including bark)	Ratio of below-ground biomass to above-ground biomass	Carbon fraction of dry matter	Annual carbon loss due to biomass removals
Initial land use	Land use during reporting year		(m ³ yr ⁻¹)	[tonnes of biomass removals (m ³ of removals) ⁻¹]	[tonnes bg dm (tonne ag dm) ⁻¹]	[tonnes C (tonne dm) ⁻¹]	(tonnes C yr ⁻¹)
			National statistics or international data sources	Table 4.5	zero (0) or Table 4.4	0.5 or Table 4.3	L _{wood-removals} = H * BCEF _R * (1+R) * CF
			H	BCEF _R	R	CF	L _{wood-removals}
FL	FL	(a)					
		(b)					
		(c)					
Total							

Sector		Agriculture, Forestry and Other Land Use							
Category		Forest Land Remaining Forest Land: Loss of carbon from fuelwood removals							
Category code		3B1a							
Sheet		3 of 4							
Equation		Equation 2.2		Equation 2.13					
Land-use category		Subcategories for reporting year	Annual volume of fuelwood removal of whole trees	Biomass conversion and expansion factor for conversion of removals in merchantable volume to biomass removals (including bark)	Ratio of below-ground biomass to above-ground biomass	Annual volume of fuelwood removal as tree parts	Basic wood density	Carbon fraction of dry matter	Annual carbon loss due to fuelwood removal
Initial land use	Land use during reporting year		(m ³ yr ⁻¹)	[tonnes of biomass removals (m ² of removals) ⁻¹]	[tonnes bg dm (tonne ag dm) ⁻¹]	(m ³ yr ⁻¹)	tonnes m ⁻³	[tonnes C (tonne dm) ⁻¹]	(tonnes C yr ⁻¹)
			FAO statistics	Table 4.5	zero (0) or Table 4.4	FAO statistics	Tables 4.13 and 4.14	0.5 or Table 4.3	$L_{fuelwood} = [FG_{trees} * BCEF_R * (1+R) + FG_{part} * D] * CF$
			FG _{trees}	BCEF _R	R	FG _{part}	D	CF	L _{fuelwood}
FL	FL	(a)							
		(b)							
		(c)							
Total									

Sector		Agriculture, Forestry and Other Land Use						
Category		Forest Land Remaining Forest Land: Loss of carbon from disturbance						
Category code		3B1a						
Sheet		4 of 4						
Equation		Equation 2.2		Equation 2.14				Equation 2.11
Land-use category		Subcategories for reporting year	Area affected by disturbances	Average above-ground biomass of areas affected	Ratio of below-ground biomass to above-ground biomass	Carbon fraction of dry matter	Annual other losses of carbon	Annual decrease in carbon stocks due to biomass loss
Initial land use	Land use during reporting year		(ha yr ⁻¹)	(tonnes dm ha ⁻¹)	[tonnes bg dm (tonne ag dm) ⁻¹]	[tonnes C (tonne dm) ⁻¹]	(tonnes C yr ⁻¹)	(tonnes C yr ⁻¹)
			National statistics or international data sources	Table 4.7 & 4.8	zero (0) or Table 4.4	0.5 or Table 4.3	$L_{disturbances} = A * B_w * (1+R) * CF * fd$	$\Delta C_L = L_{wood-removals} + L_{fuelwood} + L_{disturbances}$
			$A_{disturbance}$	B_w	R	CF	$L_{disturbances}$	ΔC_L
FL	FL	(a)						
		(b)						
		(c)						
Total								

Note: fd = fraction of biomass lost in disturbance; a stand-replacing disturbance will kill all (fd = 1) biomass while an insect disturbance may only remove a portion (e.g. fd = 0.3) of the average biomass C density.

Table 13: Oven dry matters, and biomass expansion factors for coniferous and deciduous tree species (TOLUNAY 2010)

Group of species	WD (Ton/ m ⁻³)	BEF _I	BEF _S	BEF _R	BCEF _I (Ton/ m ⁻³)	BCEF _S (Ton/ m ⁻³)	BCEF _R (MTon / m ⁻³)
Coniferous	0.446	1.195	1.240	1.378	0.533	0.553	0.614
Deciduous	0.541	1.230	1.260	1.400	0.665	0.682	0.757

6.5.1 Carbon Fluxes among Dead Wood, Litter and Forest Soil

Under the scenario of no disturbances, the fluxes in these pools are negligible and ignored for conservatism. Some researches on litter decomposition, carbon losses via soil respiration or fine root masses were predicted however in Turkey (Sarıyıldız 2003; Tüfekçioğlu et al. 2004; Sarıyıldız et al. 2005; Tüfekçioğlu and Küçük 2005; Tüfekçioğlu et al. 2005; Sarıyıldız 2008; Akburak 2008), but all of these studies realised in the *Picea orientalis*, *Abies nordmanniana* and *Fagus orientalis* forests located in northeastern Turkey. Due to the ecological differences and the insignificance of this fluxes in the no-disturbance scenario, these are going to be ignored. At the same time, the project will support research of

the impact on these pools in the case when risks such as fires, pests or unsustainable logging materialize, and the project will obtain new evidence for Turkey for the first time in this respect. Correspondingly, in case when certain land use categories in the project pilot sites will be transformed because of these threats, the MRV will apply those coefficients which will be obtained from these studies.

6.6 Use of software for MRV

The project did most of the calculations so far in MS Excel software. For the purpose of data organization, maintaining the system, producing reports and sharing it, the project is planning to use the web-based software developed under the UNEP-GEF Carbon Benefits Project. During the PPG, that project did not yet produce the online module to operate with Tier-2 approaches, but it is expected to be available on-line by December 2012, and so the project team will be trained by UNDP to install and use this system. For more information on the CBP, please go to - http://www.unep.org/ClimateChange/carbon-benefits/cbp_pim/#

6.7 Accounting for, and mitigating for, emissions from tourism in the forestry sector (especially in protected areas)

Under this activity, this MRV will not be used to provide information on emission from tourism in forests, that would be fed to national reporting to UNFCCC. This is so in order to exclude double counting, since emissions from tourism (both domestic and international tourists while inside the country) visiting by road transport is accounted for under UNFCCC Reporting Subcategory Transport – Road Transport, while emissions related to air travel of domestic tourists is accounted for under UNFCCC Reporting Subcategory Transport – Air Transport. International air travel of tourists is accounted for by those countries who maintain the fleet of the carriers who bring in the international tourists to Turkey.

While because of double counting this information is not going to be separately reported at the national scale, at the same time, information on forest tourist travel emission, if segregated could represent an estimate of the carbon foot-print, and if found substantial, would require appropriate mitigation actions by the forest sector to offset them.

As of 2013, this impact cannot be calculated with precision since the Ecotourism Strategy of the General Directorate of Forestry has not been finalized and launched and it is not possible to forecast the levels of growth in the tourist inflows. The Tourism Strategy of the General Directorate of Forestry is expected to be finalized by 2014, and will then make available a picture on the tourism loads. Based on that, the forest-sector MRV will assess the impact of forest tourist travel impact with precision, comparing the baseline (as of the date of adoption of the Tourism Strategy) and 10 years from baseline under growth scenario (as will be forecasted by the Strategy). This will be done at some point in 2014-2015. Since there is no single IPCC approved methodology to assess emission from tourism travel, specifically in forests, the MRV will rely on one of the advanced international assessment methods and approaches, such as those referred to in the links below:

- Climate Change and Tourism – Responding to Global Challenges, WTO, UNEP, 2008 (<http://www.unep.fr/shared/publications/pdf/WEBx0142xPA-ClimateChangeandTourismGlobalChallenges.pdf>)
- Measurement of CO2 emissions from ecotourism in Malaysia <http://scialert.net/qredirect.php?doi=jas.2012.1832.1838&linkid=pdf>
- Peeters, P. et al. (2007a), 'Air Transport Greenhouse Gas Emissions', in P. Peeters (ed.), *Tourism and Climate Change Mitigation – Methods, Greenhouse Gas Reductions and Policies* (pp. 29–50), NHTV Academics Studies, No. 6, NHTV, Breda University, Breda.

Based on this or other appropriate assessment, adapted to Turkey, in case the annual growth in emissions from tourism along the trajectory of going from baseline to the 10 years away from baseline (as forecasted by the Ecotourism Strategy), exceeds the established UNFCCC negligence interval, a series of mitigation

measures would be proposed under the Forest Sector National Appropriate Mitigation Action (NAMA), primarily (1) forest plantations, (2) introduction of electric cars in forest parks and similar sustainable transport measures, and (3) expanded use of solar technologies in forest park facilities, and (4) improvements in energy efficiency. Detailed plans for these will be developed in the NAMA and approved by Government.

REFERENCES

- ASAN, Ü., 1999: Climate Change, Carbon Sinks and the Forests of Turkey. Proceedings of the International Conference on Tropical Forests and Climate Change: Status, Issues and Challenges (TFCC '98). pp. 157-170, Philippines.
- ASAN, U. 1999b. Using possibilities of satellite images in Forestry and the applications in Turkey. International Symposium on remote sensing and integrated technologies. Istanbul , Turkey. 20. - 21.Oct. 1999. Istanbul Technical University. pp. 113-126
- ASAN, Ü.; ÖZDEMİR, İ., 2002: Determination of Agricultural Aimed Olive Plantations by Means of Multi-Spectral Satellite Images in Large Scale Forest Mapping in the Mediterranean Region. *AGROENVIRON 2002, 26-29 October 2002, Cairo, Egypt*
- ASAN, Ü. ; ÖZDEMİR, İ. 2004: Separation of Agricultural Aimed Plantations From The Forest Cover by Using The LANDSAT-5TM and SPOT-4 HRVIR Data in Turkey. *International Archives of Photogrammetry, Remote Sensing and Spatial Information Sciences, Volume XXXVI, Part 8/W2, ISSN 1682-1750, pp 324-327.*
- ASAN. Ü., 2006; Final Report for the LULUCF Forestry Group Concerning the Estimation of Net Annual Amount of Carbon Uptake or Release in the Forests of Turkey.
- DEES, M., KOCH, B. AND PELZ, D. R. 1998. Integrating Satellite Based Forest Mapping with Landsat TM in a Concept of a Large Scale Forest Information System. *Photogrammetrie Fernerkundung Geoinformation*, 4:209-220.
- DEES, M. ; ASAN, Ü.; YESİL, A. 2003: Ideas And Options For A National Forest Inventory For Turkey. *Advances In Forest Inventory For Sustainable Forest Management And Biodiversity. Kluwer Academic Publishers, Forestry Sciences pp. 375-395.*
- FAO 2009: Global Forest Resources Assessment 2101: Country Report for Turkey 2010/214.
- IPCC. 2003: Good Practice Guidance for Land Use, Land Use Change and Forestry. <http://www.ipcc-nggip.iges.or.htm>
- IPCC. 2006: Good Practice Guidance for Land Use, Land Use Change and Forestry. <http://www.ipcc-nggip.iges.or.htm>
- ÖZDEMİR, İ; ASAN, Ü.; KOCH, B.; YEŞİL, A.; ÖZKAN , U.Y.; HEMPHILL, S. 2005: Comparison Of Quickbird-2 And Landsat-7 Etm+ Data For Mapping Of Vegetation Cover In Fethiye-Kumluova Coastal Dune In The Mediterranean Region Of Turkey. *FEB/ Vol 14/ No 9/ 2005 – pages 823 – 831*
- OZDEMIR, İ. ; KOCH, B. ; ASAN, Ü. ; GROSS C.P. ; HEMPHILL, S. 2007: Separation of Citrus Plantations from Forest Cover using Landsat Imagery. *Allg. Forst- u. J.-Ztg.*, 178. Jg., 11/12, pp. 208-212
- SARAÇOĞLU N (1998) Kayın (*Fagus orientalis* Lipsky) biyokütle tabloları. *Turk J Agric For* 22: 93-100.
- SARAÇOĞLU N (2000) Sakallı Kızılağaç (*Alnus glutinosa* (L.) Gaertn subsp. *barbata* (C.A. Mey.) Yalt.) biyokütle tabloları. *Turk J Agric For* 24: 147-156.
- SARIYILDIZ T (2003) Litter decomposition of *Picea orientalis*, *Pinus sylvestris* and *Castanea sativa* trees grown in Artvin in relation to their initial litter quality variables. *Turk J Agric For* 27: 237-243.
- SARIYILDIZ T, TÜFEKÇİOĞLU A, KÜÇÜK M (2005) Comparison of decomposition rates of beech (*Fagus orientalis* Lipsky.) and spruce (*Picea orientalis* (L.) Link.) litter in pure and mixed stands of both species in Artvin, Turkey. *Turk J Agric For* 29: 429-438.
- SARIYILDIZ T (2008) Effects of tree canopy on litter decomposition rates of *Abies nordmanniana*, *Picea orientalis* and *Pinus sylvestris*. *Scand J Forest Res* 23: 330-338.

- SUN O, UĞURLU S, ÖZER E (1980) Kızılçam (*Pinus brutia* Ten.) türüne ait biyolojik kütlenin saptanması. Ormancılık Araştırma Enstitüsü Teknik Bülteni, Teknik Bülten Serisi No: 104, p. 32.
- TOLUNAY D, ÇÖMEZ A (2008) Türkiye ormanlarında toprak ve ölü örtüde depolanmış organik karbon miktarları. In: Hava Kirliliği ve Kontrolü Ulusal Sempozyumu Bildiri Kitabı, Hatay, pp. 750-765.
- TOLUNAY, D (2010) Biomass factors and equations for the young Scots pine trees (*Pinus sylvestris* L.) in northwestern Turkey. Unpublished manuscript.
- TOLUNAY, D., ÇÖMEZ, A. 2007. Orman topraklarında karbon depolanması ve Türkiye'deki durum. *Küresel İklim Değişimi ve Su Sorunlarının Çözümünde Ormanlar 13-14 Aralık 2007, İstanbul*, pp:97-108
- TOPALOĞLU E (2005) Trabzon-Yeşilbük Yöresinde Yetiştirilmiş Monteri çamı (*Pinus radiata* D. Don) Odununun Fiziksel ve Mekanik Özellikleri. Yüksek Lisans Tezi. Karadeniz Teknik Üniversitesi Fen Bilimleri Enstitüsü, p. 111.
- TÜFEKÇİOĞLU A, GÜNER S, KÜÇÜK M (2004) Root biomass and carbon storage in oriental spruce and beech stands in Artvin, Turkey. *J Environ Biol* 25: 317-320.
- TÜFEKÇİOĞLU A, KÜÇÜK M (2004) Soil respiration in young and old oriental spruce stands and in adjacent grasslands in Artvin, Turkey. *Turk J Agric For* 28: 429-434.
- TÜFEKÇİOĞLU A, SARIYILDIZ T, GÜNER S, KÜÇÜK M (2005) Artvin Genya Dağı Doğu ladini meşcerelerinde kök kütlesi, yıllık ibre dökümü ve toprak solunumu miktarlarının değişimleri. In: *Ladin Sempozyumu Bildiri Kitabı, Trabzon*, pp. 123-129.
- UĞURLU S, ARASLI B, SUN O (1976) Stebe geçiş yörelerindeki sarıçam meşcerelerinde biyolojik kütlenin saptanması. Ormancılık Araştırma Enstitüsü Yayınları, Teknik Bülten Serisi, No 80, p. 48.
- ÜNSAL A (2007) Adana Orman Bölge Müdürlüğü Karaisalı Orman İşletme Müdürlüğü Kızılçam Biyokütle Tablolarının Düzenlenmesi. Yüksek Lisans Tezi. Zonguldak Karaelmas Üniversitesi, Fen Bilimleri Enstitüsü, p. 51.
- YESİL, A., MUSAOĞLU, N., KAYA, S., COSKUN, G., ASAN, U. AND ÖRMECİ, C. 1999. Statistical modelling and stand type mapping selected area around Istanbul using Landsat and Spot data. *International Symposium on remote sensing and integrated technologies. Istanbul , Turkey. 20. - 21.Oct. 1999. Istanbul Technical University. pp. 151-162*

Annex L. Incorporation of gender aspects in the project

Status quo of women in the pilot sites

Women of forest-dependent families in the Mediterranean region of Turkey are primarily true housekeepers. Besides the common responsibilities of motherhood and/or wifehood at home, housekeeping activities in a forest family involve notably hard physical work such as gathering and cutting fuelwood for domestic use, and maintenance of the house and its surroundings. Even though not compensated in a pecuniary sense, all these works of women undoubtedly provide indispensable and not substitutable social and economic benefits to forest-dependent communities.

In addition, women in forest communities are involved in forest field work to at least the same degree as men are. Local forest administrations hire, by law, forest families for various field works, including timber harvest and plantation. And most of the time when it comes to work in the woods, family means family; that is, there will be barely any distinction of gender in the forest works for earning household income. In fact, female workers may even be preferred by forest administration for certain forestry works such as pine cone collection or seeding as being more diligent and handy compared with men.

Although permanent emigration from rural settlements, including forest villages, to urban areas has subsided, seasonal migration is still an issue. In certain forest communities, such as within Andırın and Pos State Forest Enterprise lands where tourism-related employment barely exists, many adult males seasonally “go down” to nearby cities during the wintertime for employment, and return home on holidays and in whole summertime. Conversely, men of many other forest villages, such as those in Gazipaşa and Köyceğiz where summer tourism offers great employment opportunities, may work near coastal areas for several months a year and go back home during the winter.

This seasonal movement of adult males for employment puts additional burden on women of forest villages with respect to caring for, upkeep and security of forest households while men are away.

Impact on and engagement of women in the project

The project will not attempt to directly intervene in the social and economic role of women in the forest communities in the pilot sites. Rather, several activities are set forth which may directly and/or primarily involve or concern women, and thus contribute towards better living conditions and livelihood of forest families.

First and foremost of the project activities that concern women is the support for wider access to solar energy for domestic heating. Not only does this project propose a governmental micro crediting program for the application of solar energy for domestic washing water heating, it also aims to explore the possibility of further utilization of solar energy, particularly for household heating in combination with water heating. Such wider access to, and further utilization of, solar energy will greatly serve to reduce the dependence of rural villagers, especially women, on harvesting fuel wood to meet household energy needs (a labor intensive and time consuming occupation that has a significant opportunity cost in terms of the time budget available for education, travel and alternative income generation).

The project also aims to achieve a better and more direct involvement of women in the designation and management of protected areas. Active involvement of women will also be sought in the process of the proposed intensive management and/or cultivation of non-wood forest products in the state forest lands nearby forest villages (see Annex J). “Involvement” in this context implies active participation of women in the relevant decision making processes, which will be realized through face-to-face discussions and interviews as well as community representation of women in village administrations, local NGOs and cooperatives.

Women of certain forest villages in the pilot sites (especially the Pos site) will also be particularly important insofar as income generation from ecotourism is aimed through certain activities supported by ORKÖY loans and/or SGP grants. For instance, proposed boarding houses for ecotourists in forest villages adjacent to the Aladağlar National Park may be better designed and handled by women of the region.

Finally, female members of forest households will indispensably be included in the proposed training on carbon monitoring and flow accounting field work. This training would be an opportunity for women to considerably contribute household income.

In total at least 2,000 women are expected to benefit from the direct involvement in the sustainable forest management activities implemented by the project in the five targeted forest districts.

Annex M. Specifics of the solar energy revolving scheme

Under Component 2 the project pilots the use of solar energy as an alternative to the use of forest for fuel. It is based on the existing experience of the use of solar energy for water heating, funded by the Government. The micro-crediting program for solar energy water heating systems (GESIS) has been in effect since 2005 following a pilot application in 2004 in other areas in Turkey. This program falls under the “social loans” conducted by Forest-Village Relations Department (ORKÖY), formerly a separate general directorate, for forest communities. Since its launch, this solar micro-crediting program has provided more than 105,000 forest village households across the country with total credit in excess of 138 million (about \$ 80 million).

Overall feasibility

The ORKÖY's ran its micro crediting GESIS program in 2005-2012 for solar energy for the forest village families in the vicinity to the project pilot sites. With a budget of 1.7 million Turkish Lira (i.e., about \$ 1 million), the scheme benefitted about 1,300 forest-dependent households. It is feasible, therefore, to expect that with similar funding under the GEF project, a similar target of 1,300 households can be achieved.

Technical parameters of GESIS

Solar energy utilization for water heating systems in Turkey is either through an open or closed system comprising 2-3 solar panels/collectors, depending on the regional conditions. In open systems, which are suitable for mild climate regions where the risk of frost is ignorable, water is heated directly in the collectors and then kept in a water tank with isolation. Designed for high-elevation localities with continental climate and frost risk, closed systems comprise a mechanism where heat-conveying liquid is heated in the collectors and circulated through a jacket around the water tank. This closed system is also suited for hard water regions.

ORKÖY administrations require certain specifications of solar energy systems that are to be credited. Detailed enough, statement of specifications announced by the administrations for this purpose appears to be well established and contains reasonable and sufficient technical requirements for the system. Specifications are approved by the Chamber of Mechanical Engineers as well. Systems are required to have a warranty of two years at minimum. The technical drawings of the mechanisms are also available at request. Specifications required by ORKÖY can well be used for the project as well. Yet, the choice between open and closed systems would need to be consulted with the local forest/ORKÖY staff in accordance with the local climate and experiences.

In many cases ORKÖY staff have help forest villagers to find and contact firms that can supply and do maintenance of solar systems in accordance with the specifications. They would provide list of firms and brands to those forest villagers that apply for the credit. In some regions, however, there exist quite many firms and/or distributors and ORKÖY administration may conceivably miss one or more names in the list provided to guide villagers. But in that case, the firms or distributors whose names happen to be not included in the list raise objections which cause friction with forest/ORKÖY administrations. Because of these negative experiences, many administrations now prefer to provide specifications and leave the identification of the firm and brand to forest families in coordination with their village headships. This latter practice seems reasonable since it would suppress possible commercial conflicts. For the purpose of this project, it is advisable that forest/ORKÖY administration, local or central, be not in a position to decide on a single firm/brand or a list of firms but be ready to provide information if the credit applicants and village headships make a request. A number of brands that would meet the required specifications in the project target sites exist. Ezinç, Eraslan and Isı Tek are just among such brands known in the country.

Other uses which have not been exploited so far which will be piloted by the project

In addition to helping to deploy the solar energy use for water heating, the GEF project will help to look into other uses that have not been exploited so far, that potential add to the threat of deforestation through fuel wood collection. This includes solar cooking systems. A UNDP Small Grants Program project was just completed in one demonstration site, showing the use of solar oven and solar cooker utilities in Central Anatolia (Project no. TUR-05-14). Technical parameters and experiences of the mentioned project will be used in the target districts of this project. Secondly, the project will pilot wider solar energy use for home heating, initially aiming to issue at least 10 micro-grants in this respect: further technical details on this option are presented below.

Micro-crediting procedures and conditions for solar energy which will be used in the project scheme

The financial support to forest-dependent communities is regulated by latest version of “The Directive on Activities for Supporting the Development of Forest Villagers” issued by the government on June 13, 2012 (Directive no: 28322). The specifics and precise formats of the documents setting out financial conditions of the GESIS program which is a type of “social” credit regulated by the mentioned directive have been well established, straightforward and accessible. Depending upon the type of solar system to be used, the GESIS credit for one household has so far ranged roughly 1,300-1,600 Turkish Lira (\$700-850). The GESIS micro-crediting program stipulates full-cost provision of loan with zero interest. The loans are repayable in three equal installments in three years after the first year of installation of solar collectors to fulfill a family’s hot water needs.

Repayment of solar credits is secured, as stipulated by the Directive 28322, through a formal debt instrument, credit contract, bank guarantee or mortgage. In practice, local ORKÖY administrations had required notarized certificate of lack of indebtedness till 2012. Beginning 2012 this practice was abandoned due to unreasonable cost of notarization, and replaced by credit contract signed by the principal (the debtor) and two co-sureties, approved by the local forest administrator. Also stipulated by the Directive, a formal document of commitment is required as well. In this commitment document the debtor shall affirm the proper use and assignability of the credit as well as sanctions in the event of failure of compliance or conformity.

The contracting scheme of ORKÖY solar credits appears to have proved to work to date, both from the government’s and the villagers’ perspectives. Thus micro-crediting conditions and relevant documentation for solar panel for domestic water heating cannot be said to need major alteration for the purpose of relevant crediting proposed by this project.

Funding for the scheme

Funding for solar energy system will essentially be provided by the Turkish government under the auspices of the Ministry of Forestry and Water Affairs which now operationalizes forest-village relations through regional and local forest administrations of General Directorate of Forests that has the new Department of Forest Village Relations (ORKÖY Department). Solar energy budget of ORKÖY department for the project horizon will be reserved as co-funding for the Output 2.3 of the project. This reserved budgetary co-funding is US\$1.0 million. The GEF will provide soft financing (200,000 under GEF CCM-3), as specified in the description of Output 2.3., to assist in the marketing and monitoring of the scheme.

The forecasted positive impact on the slow-down of the deforestation rates

The Table A7-presents the current profile of fuel-wood use in forest villages in the target districts. Note: the “stere” is the FAO-acknowledged unit to measure the consumption of fuel wood, which is “stacked cubic meter” <http://en.wikipedia.org/wiki/Stere> (i.e. a cubic meter of stacked fuel wood, which is equal to 0.75 of a metric cubic meter fuel wood). The amount of legally procured fuel wood (32,450 steres as of 2009) should arguably be increased by about 30% (i.e. by almost 10,000 steres) in order to account for the illicit logging in the pilot sites. This estimation is based on the local forestry staff and experiences. An estimate of 10,000 steres of illegal fuelwood logging per year in the pilot sites stands to be defensible based upon the professional observation and experiences.

Moreover, forest villagers area allowed to collect the residuals of timber harvest and forest tending as fuelwood. This is essentially not an illicit action, yet nor is it a formal, planned and recorded mode of utilization. Again based on the observations and experiences, this type of fuelwood collection may arguably amount up to one fourth of fuelwood formally provided to forest villagers as subsidized sales, i.e., 25% of 32,450 steres amounting to about 8,000 steres.

All in all, forest villagers in the project pilot sites can be said to use over 50,000 steres of fuelwood

Table A7-1. Fuel wood use of forest villages in the pilot sites through subsidized sales, illegal logging and collection of remains

Project district	Forest Village (by Article 31 and 32 of the Forest Law combined)
	Below-cost (subsidized) fuelwood sales- in steres (2009)
Below-cost subsidized sales	
POS	11,448
GAZİPAŞA	2,276
ANDIRIN	16,715
GÜLNAR	668
KÖYCEĞİZ	1,343
Total	32,450
Illicit logging (steres)	10,000
Collection of residuals (steres)	8,000
Grand Total (Fuelwood used by forest villagers)	50,450

Within the available budget under the GEF project, the project is targeting 1,100 families. At least 1,000 families are expected to benefit from the solar water heating technology; further 100 will benefit from a combined water heating and cooking technology (see details below).

For the 1,000 households benefitting from the solar water heating technology, the ORKÖY estimates an average of 5 steres of yearly consumption of fuelwood by a forest household for washing water heating. Provided that this is the case, if 1,000 households benefit from the solar micro-crediting component of the project in view of the budget allocated for Outcome 2.3 and the current cost range of solar systems, at least 5,000 steres or half of the fuelwood illicitly harvested, can be saved.

The combined water-heating and cooking technology, described below has not yet been widely tested, but is promising. Given the risks, the project will pilot it for maximum 100 families. If successful, the technology will be replicated in other forest regions of Turkey through government financing. An integrated solar-KUZİMBİ system may be allegedly expected to provide as much as a total of 14 steres in the annual current consumption of a forest household in the Med Region. For 100 families this is 1,400 steres.

Thus, the total reduction in the impact on forests is going to be $5,000 + 1,400 = 6,400$ steres or 4,800 cubic meters of fuel wood. The total benefit of this activity under Output 2.3 amounts to 13,038 tCO₂/y. The total installed capacity of all equipment is forecasted to be at least 6 MW of thermal energy.

Short description of the “KUZİMBİ” system to be trialed on a pilot basis

The name “KUZİMBİ” is a truncated combination of the words “kuzine (*cookstove or range*)” and “kombi (*boiler*)”. Comprising a cookstove and a boiler along with a set of radiator panels and of water taps, KUZİMBİ is a system for heating a rural house together with its domestic water. The system is basically intended to be an energy-efficient mechanism which consumes considerably less fuelwood, and provides more comfortable and healthier domestic heating. KUZİMBİ is said to be ideal for mid-size rural dwellings with a closed area of 90 m², although it may be set up for houses up to 120 m² large. Furthermore, the system is specially designed for rural houses where 2 or 3 heating devices (be they stoves and/or fireplaces) are simultaneously used in different rooms of the house especially during the winter time.

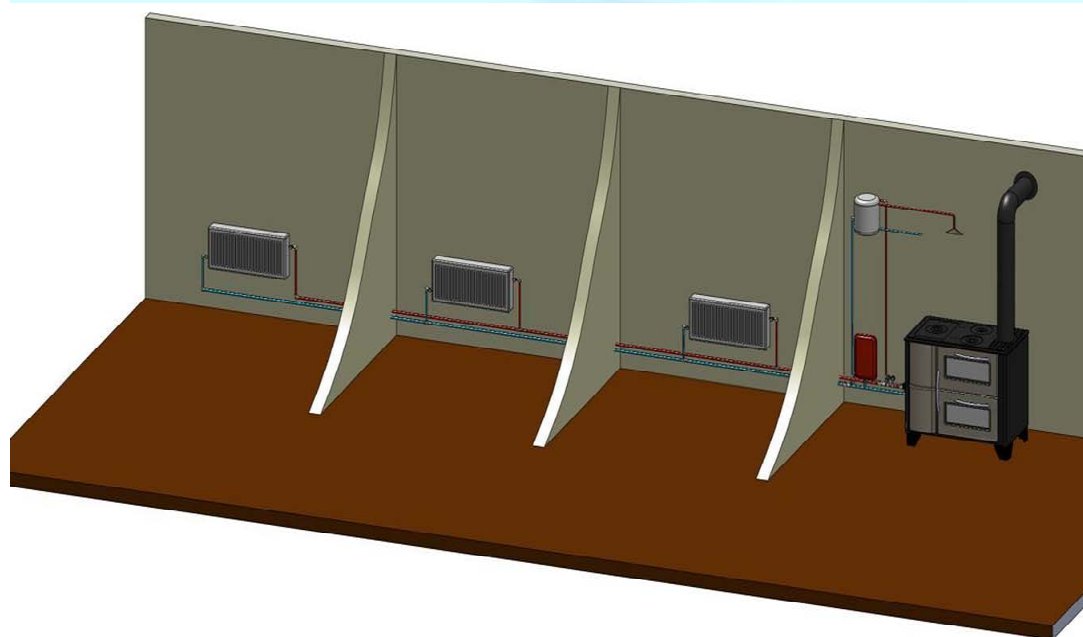
KUZİMBİ system has been set up in more than 10 forest village houses in Eskişehir, Bilecik and Bursa provinces. Experiments have shown that it is able to reduce the annual consumption of 35 steres of fuelwood down to 20 steres or even less (**more than 40% reduction**), and provide better quality, cleaner and healthier heating (A NOTE: The mentioned provinces are generally known to have a winter conditions way harsher than the Mediterranean regions, thus the estimated 35 steres of fuelwood sounds reasonable to be the annual consumption of a traditional forest family. However, the baseline annual consumption for a Med Region forest household would be no more than two thirds of 35 steres, or about 20 steres.).

There has been no previous experience or trial of combining KUZİMBİ with solar energy system. However, the firm, Saylan Machine Industry Limited, claims that such integration is technically viable, and

would exemplify more efficient and comprehensive utilization of both solar energy and wood. Researchers say that the regular two- or three-panel solar energy system can be integrated to KUZİMBİ for the purpose of “pre-heating” or at least “pre-warming” of water which would then be heated in the KUZİMBİ boiler and conveyed to the radiator panels and water taps distributed in the house. Such addition of solar system to KUZİMBİ could, as the firm reckons, further halve the fuelwood combusted in the current KUZİMBİ. Nevertheless, they admits that the precise degree of further reduction cannot be said unless several pilot applications of solar-KUZİMBİ integration are carried out in different villages at different altitudes. All in all, substantial further reduction in fuelwood consumption of KUZİMBİ should occur in addition to the current fuelwood saving by KUZİMBİ itself.

Assuming a 20-stere annual consumption of fuelwood for complete (house+water) heating in a an average forest village dwelling in the Med Region, a standard KUZİMBİ without solar system can save up to 8 steres of fuelwood from burning (40% of 20 steres equals 8 steres). That is, standard KUZİMBİ would require only 12 steres of fuelwood per year. Furthermore, when a regular solar energy system is integrated to KUZİMBİ for pre-heating the water beore it arrives the boiler, this estimated 12 steres can go down as low as 6 steres a year (half of standard KUZİMBİ’s consumption). Hence, an integrated solar-KUZİMBİ system may be allegedly expected to provide as much as a total of 70% reduction (14 steres) in the annual current consumption of a forest household in the Med Region. We can favorably compare this 14 steres of fuelwood saving with the estimated 5-stere saving through the regular solar energy system (GENSIS) that is used only for domestic water heating. That is, the integrated solar-KUZİMBİ system holds, based on the firm’s claims, the potential of saving fuelwood almost three times more than GENSIS.

A standard KUZİMBİ system does cost the manufacturing firm about ~4,400 (\$2,450) exclusive of firm’s profit (very detailed cost itemization is already available). A firm profit of ~600 (\$350) can be expected to occur, which makes the standard KUZİMBİ cost add up to ~ 5,000 (\$2,800). When the KUZİMBİ is to be integrated with the regular solar energy system (GENSIS) that costs ~1,600 (\$900), total cost of establishing the integrated solar-KUZİMBİ (or KUZİMBİ-GENSİS) should be expected to reach ~6,600 (\$3700) per household. This estimation excludes the cost electric consumption need to run the complete system, which is about ~100 (\$60) a year.



Picture 1: Four-panel KUZİMBİ system (Developed by Kemal Saylan)



Picture 2: A forest village household with KUZIMBI system

Annex N - Framework for development of a revenue-sharing mechanism for carbon credits

First of all, it needs to be recalled that the ownership of virtually all forest lands in the pilot sites, like in most of the country, rests with the State. By the same token, one could conceivably assert that in principle “any” revenue to be gained through the forest lands shall also belong to the State. And the possible revenue that would result from selling carbon credits acquired through forest protection would not be an exception to that statement. After all, it is a matter of property rights. In compliance with being a “social state”, however, the State is supposed to be occupied with elevating the well-being of forest-dependent communities in the country. Consequently, the State can be expected to establish channels for allotting the possible carbon credit earnings to forest villagers, just as there have been several socio-economic instruments to support forest villagers in the context of forest management to date.

In as much as the notion of protected area is perceived by forest-dependent communities to be a restriction or even a total abolition of previous land use modes, any degree of establishment of protected area or corridor would perceivably result in some degree of “opportunity cost” to the forest-dependent communities. This is because forest villagers dwell in or near the forests, and are inevitably employed in certain forest operations in different modes, even though the State does own and, through forest administration, manage forest lands. Therefore, it appears to be imperative to involve forest communities actively when it comes to determining a scheme or mechanism for distributing or “sharing” revenues of carbon credits earned by forest protection.

A village is a legal entity in Turkey, so is a forest village. During the process of determining a revenue-sharing mechanism the legal entity of each forest village should be recognized as a party to be involved. In fact, the degree of the aforementioned opportunity cost, i.e., the forsaken traditional land use as well as lost forestry employment and benefits, would vary between villages. So, as opposed to working with a few entities or personalities supposedly representing all forest villages, it would be fairer and more efficacious to consider the village-level differences and to let each forest village legal entity partake in the process.

Involvement of forest communities could further be more effective and meaningful if cooperatives for developing forest villages (FORCOOP's) are recognized and directly involved in the process of constructing a viable revenue-sharing mechanism. FORCOOP's are officially organized in most forest villages. In addition to forest-related benefits (e.g. those benefits by Article 31 and 32 of Forest Law) enjoyed by forest communities just because of residing in or near a State forest, there also exist direct and indirect economic benefits (e.g. those benefits by Article 34 of Forest Law) that are channeled to forest villagers solely through FORCOOP system. By the same token, forest communities might have to forsake the current benefits for forest villagers but also the benefits enjoyed only by members of the FORCOOP's.

Nature of a mechanism for distributing carbon earnings does in fact depend on the magnitude of the expected revenue. At this stage, one could only speculate on the pecuniary value of the proposed carbon sequestration and/or emission mitigation of this project. The carbon value, hence the revenue to be shared, can be deemed to be contingent upon the structure and legal status of the carbon market (i.e., whether a voluntary/over-the-counter market or an established exchange). Also, the market value of the carbon, like of other “commodities”, is contingent upon the “cost” borne to produce it. When we look in the over-the-counter markets and official exchanges throughout world, we observe a rather wide range of at the monetary value of the carbon. One carbon credit, or carbon offset, representing reduction of one metric ton of carbon dioxide being released into the atmosphere is currently priced at as low as 1 cent and more than 100 dollars. Although we cannot currently ascertain the magnitude of the carbon revenue because of the expected outcomes of the project, it may not be worthy of sharing at household level. Should it turn out to be the case, the mechanism would rather be designed so that the forest communities have their share at village level, and employ the allotted carbon revenue for more visible and rational purposes. For example, it might be socio-economically wiser to allocate a village of 100 households 5,000 dollars a year rather than allocating each household in the same village 50 dollars a year.

ANNEX S – Details of GDF contribution³⁷

Output	Contribution detail	Amount of contribution (USD)	
		In kind	Total
1.1 A LULUCF unit in GDF with specialized capacities and tools to design, implement and monitor efforts to conserve and enhance Turkey's forest carbon stocks	GDF Staff cost	756,000	756,000
	Office rent and cost	141,000	141,000
1.2 Regulatory and methodological revisions to enable accounting for multiple benefits arising from Turkey's forests	GDF Staff cost	42,800	42,800
	Meeting costs	70,000	70,000
1.3 Initial development and deployment of MRV for Turkey's Mediterranean forests	GDF Staff cost	25,000	25,000
1.4 Capacity building of national- and field-level foresters in forest biodiversity conservation and monitoring and LULUCF carbon monitoring and accounting	GDF Staff cost	25,000	25,000
	Travel costs	25,000	25,000
1.5 Nationally Appropriate Mitigation Action(s) covering the forest sector	GDF Staff cost	55,000	55,000
	Travel costs	10,000	10,000
	Vehicle costs	10,000	10,000
	Fuel costs	5,000	5,000
2.1 Integrated fire management systems at Forest Enterprise Directorate (FED) level, focussing on scientifically justified fire fuel management, consisting of (i) a fire management information system (wildfire hazard and risk analysis; fire danger rating and early warning), (ii) anthropogenic fire prevention planning involving local communities and the general public, and (iii) decision support for wildfire preparedness with streamlined collaboration between responsible authorities (forest department, and fire and emergency services)	GDF Staff cost	151,200	151,200
	Printing and posting costs	148,800	148,800
	Combatting forest fire costs	1,800,000	1,800,000
	Vehicle costs	200,000	200,000
	Fuel costs	375,000	375,000
2.2 Enhanced silvicultural efforts—including carbon-focused thinning (5,000 ha), forest rehabilitation to increase crown cover in selected areas from 10-15% to 50% (3,000 ha) and native forest plantations (1,200 ha) at pilot sites	GDF Staff cost	240,000	240,000
	Silviculture costs	2,000,000	2,000,000
	Vehicle costs	160,000	160,000
	Fuel costs	66,000	66,000
2.3 Micro-crediting program to support access to solar heating technologies in pilot areas as a means to avoid illicit cutting of native forests.	GDF Staff cost	151,200	151,200
	ORKOY costs	1,000,000	1,000,000
	Vehicle costs	129,000	129,000
	Fuel costs	150,800	150,800
2.4 Integrated pest management system for forest management including establishment of two pest biological control and early warning centers in the Mediterranean region equipped with technologies for field observations and early problem identification as well as a laboratory dedicated to research and training on natural enemies.	GDF Staff cost	151,200	151,200
	Forest Pest Management Costs	1,900,000	1,900,000
	Vehicle costs	55,000	55,000
	Fuel costs	50,000	50,000
2.5 Carbon stock and stock change measurements taken at pre-selected monitoring sites within	ORBIS costs (database, data, data input)	5,000,000	5,000,000

³⁷ (i) The contribution provided by GDF for an amount of 19,400,000 USD, will not be transferred to UNDP and will be provided by the activities have been / will be implemented by the GDF under the budget of Government of Turkey, in the frame of the relevant regulations.

(ii) Contribution of the GDF for the amount of 19,400,000 USD is an indicative contribution and open for amendment.

(iii) Amendments regarding the co-financing are open via the revision of the Project Document in line with the related regulations.

the pilot areas using the methodology designed in Output 1.3. Precision of carbon benefits generated by the project is improved each time the measurements are taken.	GDF Staff cost	378,000	378,000
	Management plans costs	500,000	500,000
	Vehicle costs	350,000	350,000
	Fuel costs	294,000	294,000
3.1. Improved protection of high nature value forests in five pilot sites covering 79,960 ha	GDF Staff cost	190,000	190,000
	Vehicle costs	250,000	250,000
	Fuel costs	200,000	200,000
	GIS costs	300,000	300,000
	ORBIS costs	960,000	960,000
3.2. Buffer zones and corridors embedding PAs (Protection Areas) and PFs (Protected Forests) in the wider production landscapes; Adjustment of the spatial plans of the neighboring districts governing land use allocations within buffer zones and corridors.	GDF Staff cost	50,000	50,000
	Vehicle costs	150,000	150,000
	Fuel costs	70,000	70,000
	GIS costs	200,000	200,000
3.3. Partnerships for eco-tourism and NWFP management established between pilot Forest Enterprise Districts (FED) and local communities, mediated by local community-based organizations and NGOs.	GDF Staff cost	25,000	25,000
	Vehicle costs	55,000	55,000
	Fuel costs	35,000	35,000
	Non-wood forest products and services costs	500,000	500,000
Grant Total		19,400,000	19,400,000