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Turkey Forestry Sector Review

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Environmentally and Socially Sustainable Development Unit
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ABBREVIATIONS AND ACRONYMS

AAC	Annual Allowable Cut
AGM	General Directorate of Reforestation and Erosion Control
ARIP	Agriculture Reform Implementation Program
DSI	State Water Works
ECA	Europe and Central Asia Region – World Bank
EU	European Union
GDP	Gross Domestic Product
GEF	Global Environmental Facility
GOP	Global Overlays Program
IFF	Intergovernmental Forum on Forests
MARA	Ministry of Agriculture and Rural Affairs
MC	Microcatchment
MNA	Middle East and North Africa Region – World Bank
MOE	Ministry of Environment
MOF	Ministry of Forestry
MPG	General Directorate of National Parks, Game and Wildlife
NGO	Non-Governmental Organization
NWFP	Non-Wood Forest Product
OGM	General Directorate of Forests
ORKÖY	General Directorate for Forest Village Relations
ORUS	State Forest Industry
SA	Social Assessment
SEKA	State Pulp and Paper Industry
SOE	State Owned Enterprise
SPO	State Planning Organization
UNCED	United Nations Conference on Environment and Development
UNFF	United Nations Forum on Forests

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EXECUTIVE SUMMARY

Introduction

1. Forests cover about 25 percent of Turkey's land area and have significant economic, environmental and cultural functions. About 15 percent of Turkey's population lives in forest villages or forest-neighboring villages where forest resources make a vital contribution to livelihood. Urban dwellers are also taking an increasingly strong interest in forests particularly with respect to their biodiversity, environmental and recreational functions. The wide distribution of forests over different geographic regions provides for genetic diversity within species that represents immeasurable ecological and economical value. Turkish forests contain a broad range of valuable commercial timber species, making Turkey nearly self-sufficient in timber. Turkish forests also host a great diversity of flora of economic importance, including various medicinal, aromatic, industrial and ornamental plants; and provide the major habitats for most species of Turkish fauna. In some areas Turkish forests still include some of the last existing vestigial stands and pristine forest ecosystems of their type. Turkish forests also play a vital role in watershed protection and the control of flooding and soil erosion, an issue of major importance in Turkey.

2. The establishment of environmentally, socially and financially sustainable systems for the management of Turkey's forests will be reliant on the Government's response to a number of challenges and choices currently facing the sector. The environment of the Turkish forestry sector is changing rapidly, offering new opportunities and challenges. Perhaps the most significant changes in the sector's national context are Turkey's urbanization and overall economic growth, which have increased the demand for forest protection and willingness to pay for non-wood forest values. Turkey's reform agenda is also a very significant aspect of the sector's policy background. Steps taken to liberalize the economy put Turkey's forest products into competition with imported timber in 1993, causing the price of Turkish timber to drop and reducing an important source of sectoral revenue. Reform of state owned enterprises (SOEs) will affect some of the Ministry of Forestry's most important customers, which are slated for reform. Ongoing agricultural policy reforms, in which input subsidies and price supports are being replaced by income support payments, will lead farmers, including those living near forests, to change their pattern of production. Finally, continued emphasis on fiscal restraint by the Government of Turkey will limit support from the national budget to cover sectoral deficits.

3. To address emerging issues, the Government of Turkey requested in 1996 that the World Bank undertake a Forest Sector Review. In response, the Bank commissioned several background studies and undertook four missions to gather data and hold discussions with Government and other stakeholders. This document summarizes the results of that work. The review has identified several opportunities for the sector. First, management could improve the commercial efficiency of timber production in some of the more productive public forest areas. This could accompany a reduced emphasis on timber production in other areas, where forest management agencies could focus instead on meeting the rising demand for non-timber forest values. Second, Turkey's domestic consumption may be able to support an expansion of the

forested area, yielding a net increase of revenue. Third, there is scope for improving sustainability by establishing community based forest management systems through introduction of long-term lease arrangements.

Challenges and Opportunities Facing the Forestry Sector

4. The review has identified several vital challenges facing the forestry sector. These include, poverty, land tenure, the need to establish multi-purpose, participatory forest management planning, and to control soil erosion in degraded areas; and the need to restore the sector's financial viability.

Poverty in Forest Areas

5. The first challenge is the poverty in forest areas. The 15 percent share of the Turkish population who live in forests or forest-neighboring villages are far poorer than the national average. Few agencies succeed in addressing their situation effectively, in part because of the remoteness of the areas where they live. They do not make a living from the forest; on the contrary, their incomes often depend heavily or in greater part on alternative land uses that can compete with forestry, such as agriculture and livestock grazing. Forest villagers do, however, depend on the forest for wood used for heating and cooking, and for animal fodder and grazing. Some wood is provided to forest villages by the Government's forestry agencies at reduced rates. An equal or larger share of wood is illicitly cut by the villagers; indeed, the illicit cut is so large that the Ministry of Forestry now takes it into account in estimating the volume which can sustainably be cut for sale.

6. Forestry agency support programs for forest villagers may, in the past, have contributed substantially to villager income. However, recent surveys show that current contributions are relatively insignificant, and that the variable most associated with poverty is relative availability of land area that the villagers can use for livestock or agriculture. The inability of villagers to generate livelihoods from forest management has led to indifference toward conservation or forest development, while efforts to sustain livelihoods by other means often come at the cost of serious natural resource degradation. Out-migration from forest villages, prompted by poverty, is affecting the character of this issue. One means of harmonizing the disparate goals of villagers and other stakeholders would be to involve them in the formulation of forest management plans, in order to identify and agree on options for addressing poor forest villager's needs that are compatible with, or supportive of, sustainable forest management.

Ownership Boundaries in Forest Areas

7. A second issue of vital importance for the sustainability of forest management is the lack of clear ownership boundaries in forest areas. Vague boundaries have led to a multitude of ongoing disputes among stakeholders. Disputes have been exacerbated by revisions of the legal definition of forest, whereby revisions are followed by removal of areas from the forest regime, thereby necessitating renewal of cadastral surveys and resulting further tenure disputes. Many stakeholders believe that these changes in legal definition serve rapid urban expansion into forest areas, and are undertaken in the interest of elites rather than local rural people or the public good.

Completion of forest cadastral surveys and settlement of ownership disputes are priority challenges of the Turkish forestry sector. Establishment of an appropriate supporting legal framework will be of great importance in addressing these challenges.

Multi-Purpose, Participatory Forest Management Planning

8. The need to realign forest management planning from the centrally planned and primarily timber focussed system of the past, to a multi-purpose and participatory planning process is a priority challenge for the Turkish forestry sector. At present, different aspects of forest planning is undertaken by each of the four different General Directorates of the Ministry of Forestry (MOF). These include:

- *General Directorate of Forests.* Forest management plans prepared and implemented by the General Directorate of Forests (OGM) aim principally at conservation of the existing forest resources and at development of forest tree vegetation (i.e. improving wood growing stock, age and diameter class distribution, wood quality) and adequate wood production. Forest inventories with this purpose concentrate exclusively on trees, providing insufficient attention to other resources and functions of forests. Under the GEF financed Biodiversity Conservation and Natural Resource Management Project, OGM will pilot approaches to incorporating biodiversity conservation in the existing forest management planning process.
- *General Directorate of National Parks, Game and Wildlife.* For national parks and protected areas, management plans are prepared and implemented by the General Directorate of National Parks, Game and Wildlife (MPG), in accordance with the National Parks Law. However, management plans have so far been developed for only a small fraction of designated protected areas. Wildlife resources inventories and management plans have not yet been completed for wildlife reserves – about 1.8 million ha, mostly occurring on forest lands. Moreover, plans fall short in sustainable management practices, particularly with respect to involvement of local people and other key stakeholders. Under the GEF financed Biodiversity Conservation and Natural Resource Management Project, MPG in collaboration with the other General Directorates of the Ministry of Forestry, local communities and other key stakeholders, will pilot participatory development and implementation of conservation management plans for protected areas and associated landscapes, including production forests and agricultural lands.
- *General Directorate for Forest Village Relations.* Forest village development plans are prepared by the General Directorate for Forest Village Relations (ORKÖY). These concentrate on small-scale income-generation activities, but do not establish clear linkages with development and conservation of natural resources. Further, most of the existing forest village development plans of ORKÖY were prepared during 1974-1984, and are now outdated. There is a need to incorporate social issues in forest management planning and realign the role of ORKÖY to a more strategic approach to catalyzing, in coordination with other development and local Government agencies, alleviation of poverty that is linked to forest resource degradation.

- *General Directorate of Reforestation and Erosion Control.* Reforestation, erosion control and pasture improvement plans and projects, prepared by the General Directorate of Reforestation and Erosion Control (AGM), have some inadequacies with regard to socio-economic, biodiversity and environmental impact aspects. However, during recent years significant progress is being made in the preparation and implementation of integrated/participatory watershed development plans under the Eastern Anatolia Watershed Rehabilitation Project.

9. Forest management plans prepared and implemented by OGM continue to be the basic plans for most forestry activities and interventions. For this reason, despite recognition of the multiple dimensions of forest resources, and the planning activities of the other three General Directorates, Turkish forestry continues to be dominated by rather a narrow emphasis on forest tree resources and sustained wood yield. According to current management plans 83 percent of the forest area is managed with wood production as the main objective and only 17 percent is assigned to other primary uses, mostly to protection of soil and water resources and also to biodiversity. This strong focus on wood production does not take fully into account the rapidly growing "new" demands for forest recreation, nature conservation and other forest values; recognition of the need for greater sensitivity to the needs of poor rural populations for fuel wood, forest-based grazing and fodder, non-wood forest products and employment; or commitments by Government to globally significant forest values. There is a need to integrate and decentralise forest management planning processes to ensure the participation of key stakeholders and greater attention to environmental values, biodiversity, cost-benefit considerations and local needs and preferences.

Controlling Soil Erosion and Reclaiming Degraded Lands

10. Soil erosion occurs on about 75 percent of Turkey's land area, and is one of the most serious environmental problems in Turkey. According to surveys, the amount of soil carried off by erosion is more than 500 million tons annually, of which 350 million tons is carried by rivers and streams into dam reservoirs, interfering with their vital functions in the energy, irrigation and agriculture sectors. Damage from frequent floods, which take lives and degrades agricultural lands and infrastructure, is also very serious.

11. While erosion control activities are underway, there are several institutional issues that may hinder the usefulness of these. One is the division of labor between AGM and OGM. AGM is assigned responsibility for planting and early maintenance of stands, while OGM assumes control after establishment through to the harvest. This allocation of effort assumes that the technical functions of forest management can be managed independent of budgetary and other incentives, and also that public agencies should have a monopoly on the management of mature stands. Experience in other countries suggests the feasibility of privatizing management of the public plantation while the State retains ownership of the forest land.

12. A further institutional issue is cooperation on watershed management. To realize maximum benefits, an integrated approach to forest management should extend to the management of watersheds, for erosion control and other purposes. There is inadequate provision in Turkish legislation to integrate the works of relevant government agencies – the

Ministry of Forestry (MOF), Ministry of Agriculture and Rural Affairs (MARA), Rural Services, State Water Works (DSI) – facilitating the active involvement of local communities, non-governmental organizations (NGOs) and other institutions in planning, rehabilitation and management of watershed areas. For example, management of degraded forest lands is technically best approached in cooperation with agencies and groups involved in livestock and range management. This integrated approach has been used effectively in several provinces in eastern Turkey, supported by the Eastern Anatolia Watershed Rehabilitation Project.

13. A third issue is how to realize the enormous opportunities for combining rural poverty alleviation with soil conservation and for involving the private sector. Various legal and financial support mechanisms have been introduced and implemented to promote private sector and rural community involvement in afforestation/reclamation activities on degraded lands in Turkey. Improvements in the current incentive system, undertaken with the participants, will be required in order to involve local communities and the private sector more extensively in afforestation and reclamation activities.

Restoring the Sector's Financial Viability

14. While timber sales were once a major source of revenues for OGM, these revenues have declined, especially since the removal of the tariff barrier and subsequent drop in wood prices. The sector now imposes net costs on the national budget. The sector's finances should be re-established on a firm basis in order to assure sustainable management of Turkey's forests.

15. OGM's sales of wood and non-wood products are the sector's key revenue source. Until 1993, revenue from wood sales was relatively protected, because OGM operated as monopolist behind a high customs wall; duties on imported wood that year amounted to 20 percent. But in 1993, following the Customs Union Agreement with the EU, duties on imported wood were abolished. Since then imported wood has appeared in the domestic market in increasing volume, recently more than 1.5 million m³ annually, approximately 10 percent of total consumption. The sale price of Turkey's wood has correspondingly declined: prices of roundwood sold by OGM dropped by approximately 30 to 40 percent from 1993 to 1999 in real terms. This trend has had a critical effect on OGM's revenue from wood sales.

16. A separate revenue issue is that more than half of OGM production is sold through administered sales at allocated prices that apply to specific buyers. In 1998, about 3 million m³ of industrial roundwood (60 percent of total roundwood production) was sold through administered sales. OGM is also legally obliged to provide logs and fuel wood to forest villages and their cooperatives at subsidized prices.

17. The declining profitability of OGM is felt broadly across the sector. OGM finances forest management, reforestation works and research through its own agencies, and supports forest villages through various employment initiatives and other efforts. As a result of the drop in OGM's revenue, various important field programs are no longer adequately financed. Moreover, OGM contributions to the AGM Fund, which finances afforestation, and to ORKÖY, which supports economic development in forest communities, are also declining.

18. OGM has begun to identify ways to reduce costs. However, there seems little prospect for realizing significant reductions in wage and labor costs, which account for the largest share of OGM's operating costs. As a result, there appears a risk that the sector will ignore pressing long term investment needs, including plantings for erosion control and reclamation of degraded land.

19. OGM's practice is to produce and sell essentially identical volumes every year. Revenue, therefore, varies with market price fluctuations. Cost prices are not calculated for a District Enterprise where the production actually takes place. Instead, they are calculated to cover Headquarters and all District Enterprises. The uniformity of management approach across OGM operations masks a high level of cross-subsidization. Some districts have a rich forest resource and substantial revenues from timber sales; for others with a poorer resource base, expenditures in management and regeneration are higher.

20. MOF has recently been studying the possibility of closing some of the forest district directorates that have continuously imposed losses on OGM. There is a need to re-assess operations on a large number of OGM District Forest Enterprises. Management of the forest resource on many of these areas may be more appropriately shifted to a less timber-intensive style of operation, at lower cost and with potentially significant environmental and social benefits.

21. Forest resource taxation (stumpage) is a complex issue and appropriate levels and assessment methods depend on ownership structure and responsibilities for reforestation as well as on economic valuation methods. The resource tax, determined each year by the State, is the amount paid by OGM for each cubic meter of wood and each unit of non-wood products sold by OGM. This tax operates as a transfer from one budget of OGM – the revolving capital budget, the immediate recipient of revenue from wood sales – to another, the added budget, where it is one of several contributions that finance non-commercial services of OGM such as reforestation and management planning. OGM's planning should take into account the economic value of natural resources in a transparent way. Further study is required to assess the feasibility of establishing a realistic level of resource tax that will ensure sustainable resource management and optimise profitability.

22. AGM is financed by the AGM Fund which, according to legislation, has numerous sources of income, including the state budget, OGM, wood buyers/importers, the Ministry of Environment, beneficiaries of subsidized forest products and donors. However, in practice, the AGM Fund's revenues are limited. Funding shortages constrain AGM's ability to carry out its mandate, which includes afforestation of Turkey's several millions of hectares of degraded area. AGM's other assigned tasks (erosion control, range improvement) are also beyond the capacity of the current budget.

23. The state budget contribution to MPG is inadequate to support effective management of protected areas. At the same time, a significant portion of revenue from the National Parks Fund (from entrance fees for national parks, nature parks and protected areas) is transferred to the Treasury but not made available for management of national parks and protected areas programs.

24. The ORKÖY Fund finances ORKÖY's activities, which are designed to improve the situation of forest villagers. By law, 0.1 percent of the national budget is to be allocated to the

ORKÖY Fund that finances ORKÖY's activities. Moreover, OGM is designated to contribute 3 percent of revenue from wood sales, plus 10 percent of its annual profit. These are the ORKÖY Fund's principal sources of funding. However, the allocation from the national budget has never materialized, and in OGM's current financial difficulties, its contribution to the Fund has fallen to 3 percent of wood sales revenues. At the same time, while the flow of resources to ORKÖY has been constrained, its performance with resources it does receive has also been weak. The ratio of ORKÖY operating cost to funds disbursed is almost 1:2, suggesting that the targeting and performance of ORKÖY operations should be subject to review and reform.

25. In summary, the financial problems of the sector arise from several sources. One set of issues relates to the operational performance of OGM and the extent to which OGM has not been able to adjust to an increasingly competitive marketplace. The second arises from the mixture of "private" and "public" good functions performed by the forest organizations. Development of a consolidated sectoral budget would provide incentives for efficient and sustainable forestry operations, promote better targeting of poverty alleviation and more secure financing for environmental management, provide information to support increased involvement of local people and other key stakeholders, and more generally improve transparency in sector operations.

Next Steps and Sector Priorities

A Vision for Forests in Turkey

26. A long-term vision of the role of the Turkish forestry sector can help to formulate the agenda for sectoral change. The principal goals of forest development in Turkey have been largely consistent over the last twenty years. They have included sustainable production of forest products and services, poverty reduction, employment generation and environmental conservation. Realization of these goals in the context of strengthened economic discipline would be likely to lead to the following:

- Multipurpose planning and management of forest resources to provide multiple benefits (environmental, social, economic and cultural) at local and national levels, and on a sustainable basis.
- A decrease in the forest areas that are managed principally for wood production, while efficient wood production in those areas would be improved. The forest area managed with a main objective other than timber production would increase.
- The area set aside for national parks and protected areas will be expanded and will adequately cover a representative range of Turkey's natural ecosystems. Effective management planning and operations will be introduced to the parks and protected areas system. Approaches already piloted to involve local people in management would be extended, providing effective protection and increased benefits to local communities.
- The levels of reforestation and rehabilitation undertaken annually on degraded forest lands will rise significantly, with the active involvement and contribution of local communities and other stakeholders. A significant proportion of these areas will be managed jointly with rural

communities to meet local demands for firewood, grazing, erosion control and non-timber forest products, employing forest management practices that conform to the principles of sustainable forest management.

- Fewer people will be dependent on the forests and the responsibility for the welfare and development of poor communities in forest areas will shift from the Ministry of Forestry to other agencies and local administrations.
- Growing public awareness and sensitivity will lead to a policy, legal and institutional framework for sustainable management of forest resources in the overall interest of Turkish society.
- Efficient conservation and sustainable management of Turkey's forest resources will make an important contribution to global values at regional and global levels, in accordance with Turkey's commitments under the relevant global conventions and international processes (e.g., United Nations Conference on Environment and Development (UNCED), Intergovernmental Forum on Forests/United Nations Forum on Forests (IFF/UNFF), and the Pan-European and Near East Processes).

Action Priorities

27. The recommendations presented below are in line with the World Bank Country Assistance Strategy for Turkey, in particular its strategic themes for strengthening environmental management, improving public sector management and expanding social services and protection. The recommendations could be incorporated into a program for natural resource development in Turkey that could be supported by the World Bank or other agencies over the medium and longer term.

28. *Poverty Alleviation.* Initiatives should be undertaken to strengthen support for poverty alleviation in forest villages that are presently dependent on excessive/destructive use of forest resources and that are not receiving adequate attention and support from present rural development programs. Farmers, including farmers in forest communities, will be eligible for direct income support under the Agriculture Reform Implementation Project (ARIP) and such payments are expected to become available in calendar year 2001. Over the course of its implementation the ARIP program is expected to phase in more targeted support for poor communities that would include forest villages. However, alleviation of poverty in forest communities will require augmenting such targeted income support with a more integrated (multi-sectoral) approach to rural development that is not based solely on forest resource management, as well as the introduction of community-based natural resource management systems.

29. *Strengthening Cadastral Surveys and Border Delineation Works for Forest Lands, Setting Tenure Disputes.* Cadastral surveys, forest border delineation and land ownership registration works have not yet been completed for significant areas of Turkish forests. The tenure disputes caused by this situation create serious constraints on adequate implementations of major forestry programs, such as reforestation and soil conservation, and also on forest villagers in use of their own agricultural and pasture lands. Moreover, frequent changes in the forest definition, followed by extraction of forest areas from forest regime, result in yet further changes in forest borders,

creating additional tenure disputes. A program should be undertaken with strengthened support to complete forest cadastral surveys, register legal borders of forest lands and settle tenure arrangements. Initiatives should also be undertaken to establish a sustainable legal framework preventing inappropriate changes in the borders and areas of forests.

30. *Institutionalization and Expansion of Demonstrated Approaches to Community-Based Multipurpose Resource Management.* Promising approaches to community involvement in natural resource management have been demonstrated in Turkey. In forestry and range and pasture management, however, these have been introduced on quite a limited scale. On the basis of successful experiences, such as the Eastern Anatolia Watershed Rehabilitation Project, Government should now move to mainstream participatory planning and management into the ongoing public investment program and into local administration. There is an urgent need to improve multipurpose management of forest resources and to invest in reforestation/reclamation of existing degraded forest areas, perhaps best addressed through community-based efforts. While restructuring the organization and finances of the forestry sector, the Government could formulate a long-term national reforestation/reclamation program, providing land allocation, utilization rights, financial, technical and extension services, and research support to community-based efforts. Designing and implementing such a program would require determination of the condition and potential of forest resources (soil, water, flora, fauna, biodiversity) as well as estimates of future demand for forest products and functions at the local and national levels. Draft Terms of Reference for a pilot study of this kind are provided in Annex 3 of this report.

31. *Piloting and Testing of Improved Approaches to Biodiversity Conservation.* Turkey's rich endowment of biodiversity stands in contrast to the meager resources made available for its management and protection. While the area of designated national parks, wildlife reserves and other protected areas has been increased in recent years, few protected areas have effective conservation focused management systems in place. Protected areas are at risk from a variety of threats including unsustainable use of natural resources by local communities and uncontrolled development for residential, tourism and other purposes. Turkish forests, both inside protected areas and in production forests, have important global values, and there may be justification for international support for conservation of biodiversity and other forest values in Turkey. In order to capture those benefits, it will be necessary to develop new models, experience and capability in protected-areas management. The recently completed GEF-supported In Situ Genetic Resource conservation project and the recently initiated Biodiversity Conservation and Natural Resource Management Project aim to provide experience in how best to manage and monitor biodiversity conservation and sustainable resource use. The objective of the Biodiversity Conservation and Natural Resource Management Project is to build capacity and develop experience that could be applied to establish sustainable decentralised participatory systems for conservation of priority Turkish conservation sites and to support sustainable forest and natural resource management more broadly.

32. *Development of Operational Restructuring Options.* The current structure of the forestry sector in Turkey needs to be reconsidered; in particular, the organizational structure of public sector agencies, the allocation of responsibilities among the public, private and local community sectors, and the financial and budgetary provisions which tie them together. A restructuring analysis would start from the most basic forest unit, identifying the most socially desirable use of its resources and the obstacles, financial, policy, institutional or other, that prevent realization of that

use. The analysis would propose management and financing arrangements, identify the legal and regulatory measures needed to introduce the desired changes, project the consequences of such a restructuring (including impacts on wood production, production of other forest goods and services and income distribution and employment) and estimate its budgetary impact (its financing requirement and any gain/loss of Government revenue). An evaluation of this kind should cover all forest management units eventually, but it would be possible to have an initial focus on areas of particular significance, consistently strong or weak financial performance or affected by pressing social issues.

Next Steps and the Potential Role of the World Bank

33. This Sector Review provides a broad overview of the challenges facing Turkish forestry and general suggestions on policies and institutional arrangements that could be pursued. An important next step would be a formal process in which a broad range of stakeholders are engaged in discussion of the perspectives offered in this report in order to develop a consensus on sectoral priorities.

34. Because the World Bank is already active in financing projects in forestry and related sectors, and is engaged in discussions on a range of agricultural policies, there is the prospect of further Bank support addressing the policy issues raised in this review. In line with the Bank's historical support to forestry in Turkey, its current involvement in the Eastern Anatolia Watershed Rehabilitation and Biodiversity Conservation Projects, and its ongoing dialog with Government on agricultural policies, further Bank involvement in Turkish forestry could take several forms. Key Bank priorities would be expansion of environmental conservation and poverty-reducing use of forest resources, especially where the local communities and other stakeholders participated in improved multipurpose management of the forest resources and in reforestation, reclamation, and improved management and use of degraded forest lands. Expansion of these efforts would need to take into account the distorting effect of policies and financial systems that partly link the availability of resources for poverty alleviation, reforestation and other reclamation activities to OGM's performance. A preferred alternative would be the collaborative design of a sectoral restructuring program that would establish more flexible and efficient commercial forest operations, better-targeted poverty alleviation and improved environmental management, with strengthened involvement of local people and other key stakeholders.

Summary of Recommendations

Issues and Strategic Considerations	Current Status	Recommendation
Forest Planning Process	Forest planning processes, guidelines and traditional practices promote an excessive orientation toward timber production and lead to under-management of other forest goods and services.	<ul style="list-style-type: none"> • Pilot and test improved approaches to biodiversity conservation. Develop new models, experience and capability in protected-areas management. • Reconsider the organizational structure of public sector agencies, the allocation of responsibilities among the public, private and local community sectors, and the financial and budgetary provisions which tie them together. (1) Pursue pilot participatory multipurpose forest management planning exercises. (2) Based on pilot experience, restructure field management units around assessment of primary management objectives, and revise management planning guidelines and standards to emphasize multiple use orientation and input from local stakeholders.
Poverty Alleviation	Some forest villages are presently dependent on unsustainable use of forest resources and are not receiving adequate attention and support from present rural development programs.	<ul style="list-style-type: none"> • Initiatives should be undertaken to strengthen support for poverty alleviation in forest villages. Integrated (multi-sectoral) rural development approaches should be considered, as well as the contributions of relevant agencies and the measures necessary to target a program to the poorest forest-dependent people
Local Control	Control over forest resources is highly centralized, with planning and decision-making focused at OGM. Local preferences are asserted through highly politicized, but informal, processes that favor established elites to the disadvantage of priority poverty groups.	<ul style="list-style-type: none"> • Approaches to community based resource management which have proven successful in Turkey in the East Anatolia Watershed Project and in the irrigation subsector should be mainstreamed through development of supportive regulations, guidelines and budgetary processes.

Village Development

Primary responsibility for forest village development resides with ORKÖY whose field program is under funded and ineffective. OGM provides in-kind subsidies through preferential procurement practices that are untargeted and unsustainable. Other government agencies, local institutions, and forest village communities (mostly located in remote areas with limited agricultural resources) are weak. Multi-sectoral and integrated rural development efforts and programs do not exist.

- A Living Standards Measurement-type study should be commissioned focusing on forest village areas for use by ORKÖY in developing a coherent strategy for forest-based poverty reduction.
- Appropriate multi-sectoral and participatory rural development models should be tested and developed through a pilot project in representative forest regions.

Land Tenure

Cadastral surveys, forest border delineation and land ownership registration works have not been completed for significant forest areas as yet. The tenure disputes caused by this situation create serious constraints on adequate implementations of major forestry programs, such as reforestation and soil conservation, and also on forest villagers in use of their own agricultural and pasture lands.

- A program should be undertaken to complete forest cadastral surveys, register legal borders of forest lands and settle tenure arrangements.

Budgetary Process

Budgets of forestry agencies are currently interlinked. Elements of AGM, MPG and ORKÖY budgets are set by formulas given in law but are consistently ignored and are infeasible.

Sales of wood at subsidized prices to some buyers, large transfers to other agencies, and financing of various activities of a public service nature from OGM's revolving fund budget weaken the link between OGM's efficiency and its apparent financial performance as a quasi-commercial entity.

- Undertake detailed review of budgetary mechanisms for OGM, AGM and ORKÖY leading to drafting of revision of legislative budgetary provisions.
- Review expenditure, employment and in-kind subsidies to forest villages and estimate equivalent.

Resource Tax (Stumpage) Reform

The resource tax paid by OGM for wood harvested from public land may not be the right financial instrument for efficient sustainable forest management.

- A study of the resource tax should be undertaken. Resource tax reform could be introduced together with restructuring of the timber sales mechanism, to ensure that OGM undertakes only the level of resource exploitation indicated by the private sector's willingness to pay.

I. INTRODUCTION

1. Forests are an important feature of the Turkish rural environment and play a vital role in the economy and in social affairs. Challenges now facing the sector, including the need to improve competitiveness and environmental sustainability and contribute to poverty alleviation, are representative of major challenges across the economy. To address emerging issues, the Government of Turkey requested in 1996 that the Bank undertake a Forest Sector Review. In response, the Bank commissioned several background studies and undertook four missions to gather data and hold discussions with Government and other stakeholders.¹ This document summarizes the results of that work.

2. This introduction briefly describes national trends prompting change in the forestry sector: (i) urbanization, which is evoking “new demands” for recreational and environmental forest services; (ii) liberalization of the policy framework in all sectors, including agriculture; (iii) reform of state-owned enterprises; and (iv) fiscal restraint. Chapter II then describes Turkey’s forest resources, including timber and biodiversity, and summarizes a valuation study; Chapter III presents an overview of forestry sector institutions; Chapter IV outlines four key challenges facing stakeholders in forestry: poverty alleviation, improvement of multi-purpose resource planning, control of soil erosion and reclamation of degraded areas, and strengthening the sector’s financial sustainability; and finally, Chapter V proposes a broad vision for forestry development in Turkey and suggests the initial steps needed to achieve it. Following the main text, a series of annexes provides additional technical detail. Annex 1 is a summary of policy recommendations.

Economic Growth, Urbanization and “New” Demands on Forest Resources

3. Over the last decade, Turkey has averaged per capita income growth of about two percent. Rising incomes and accompanying urbanization have led to increases in overall demand for forest products, and to a very significant increase in demand for environmental, recreational and other services of forests. One estimate shows that more than 5 million people now visit Turkish recreational sites² per year. Eco-tourism is rapidly growing in several regions of the country including the Mediterranean, Aegean and Black Sea regions. In the Alanya district of Antalya province alone, there are 7 private eco-tourism firms which carry over 20,000 visitors to mountain and forest areas every year. In addition, game and wildlife hunting is another popular activity in Turkey. Estimates are that there are over 1 million licensed hunters and 3 million unlicensed hunters in Turkey. In Anatolia alone, there are two hunting tourism firms organizing regular safari tours for foreign hunters. International experience suggests that this trend will be accompanied by demands for better forest fire

¹ Separate reports have been prepared addressing: (1) social assessment of the forest village communities; (2) legal, institutional and fiscal issues; 3) the Global Overlays Program; 4) a review of the key Turkish literature in this field. Moreover, a World Bank mission reviewed forest management and pasture and grazing issues; the results of that work are also available in draft. A Stakeholders’ Consultation Workshop was held to discuss and evaluate draft findings and recommendations of the Forestry Sector Review.

² 428 forest recreation sites covering 15,946 ha are under the management of the General Directorate of National Parks, Game and Wildlife.

protection, protection of the visual amenity provided by forests within view of urban areas, and protection of forests which are not actually visited or seen.

Liberalization of the Policy Framework

4. Turkey's economic policies have distorted productive sectors and increased the fiscal deficit. Moreover, agricultural subsidies and supports designed to promote equity are, in practice, being captured mainly by large farmers (by the Treasury's calculations, an estimated 10 percent of subsidy funds reach the intended beneficiaries). The Government of Turkey is modifying its economic policies, bringing them into line with Turkey's obligations under World Trade Organization agreements as well as anticipated developments in the Common Agricultural Policy of the European Union (EU) to which Turkey became a full candidate in 1999. State interventions in pricing are being reduced (the corresponding equity goals will be pursued by means of direct income support to target groups). The agenda is also to include phase-out of input subsidies, development of commodity markets futures markets, and a system of agricultural product insurance. The Government has programs on this complex agenda through major reforms in agricultural policy supported under the Economic Reform Loan, and to be further supported under the Agriculture Reform Implementation Program.

5. Forestry has already been affected by an initial wave of liberalizing policies. Relaxation of tariff barriers on wood products in the early 1990's, not yet matched by deregulation on the input side, has accentuated the cost-price squeeze on the sector's finances. It is hoped that, as Government proceeds to remove distortions from pricing of other crops, the resulting second-round effects on land prices, rural wages, subsidized sales and other budget items will restore the terms of trade between forestry and other agricultural sub-sectors.

6. If the economic liberalization program fails to give adequate attention to critical issues such as rural poverty and natural resources degradation, then serious, negative impacts on forest communities and forest resources are likely to occur. Realization of the potential benefits of liberalization depends on whether forestry is re-positioned to take advantage of new opportunities and challenges.

Reform of State-Owned Enterprises

7. The Government's intended divestiture of state-owned enterprises will also affect the forestry sector. Turkey's state-owned enterprises (SOEs) have long been a major drain on the budget and a drag on the economy. Through divestiture, privatization and closure of state-owned enterprises, the Government anticipates improvement of productive and allocative efficiency. For the time being, legal and political challenges have slowed divestiture, and the divestiture process has also been diverted by a focus recently on using proceeds to finance the budget deficit. However, the Government has undertaken transfer of majority ownership and control of substantial going concerns to the private sector. Important initiatives not yet fully underway include tightening the financing limits on the major loss-makers, reducing operating losses through aggressive restructuring and downsizing, employment of professional management in the SOEs that the Government intends to retain, and removal of political interference in operations. These initiatives are especially important because the immediate closure of large, loss-making enterprises does not appear to be politically feasible at this time.

8. The structure and finances of the forestry sector will be strongly influenced by the outcome of the reform of SOEs. Reform of SOEs that consume forest products could strongly contribute to the revitalization of the sector's financial prospects, because below-market prices and timber allocations made available to some SOEs are a drain on the budget of the General Directorate of Forests (OGM), while it is the SOEs' inefficient use of resources that sets a limit on their ability to pay.³

9. It is unclear whether the Government's SOE reform agenda will be applied to OGM. While not legally an SOE, OGM functions as a quasi-commercial entity that is expected to generate an operating surplus and to finance its activities from its sale of forest products. As such, it is susceptible to the same pressures that compromise the efficiency and performance of SOEs. Clarification is needed on the extent to which Government's approach to SOE reform can and should be applied to OGM in order to eliminate constraints on OGM's competitiveness.

Public Expenditure Restraint

10. The Government's initiatives to restrain public expenditure will have a strong influence on forestry institutions in the public sector. First, containment of government personnel costs would be a central part of an effective fiscal consolidation effort. The Government's recent reform strategy has included hiring restrictions, promotion of early retirement, and salary and wage restraints, in the short term; and, in the medium-term, introduction of position budgeting followed by comprehensive civil service reform. The short-term measures will not be sustainable unless the medium-term agenda is undertaken, despite its political difficulties. Second, expenditure restraint may be an occasion for review and reorientation of the public investment program as well. Last, budgetary restraint may be an opportunity to address expenditure management and control. The institutional framework for these functions needs to be improved, especially rationalization of the extra-budgetary system which weakens both expenditure control and transparent implementation of expenditure priorities.

11. The need for fiscal restraint across the public sector has fundamental significance for forestry development. With the financial position of OGM continuing to deteriorate, the critically important non-commercial portions of the sector, including erosion control, reforestation, national parks and protected areas, game and wildlife, and support for forest villages are increasingly subject to the discipline of the overall public budget. Reform of the forestry sector must be achieved within the constraints of the Government budget and ideally would be budget-enhancing. To ensure that forestry reform is budget neutral or enhancing will require increased involvement from the private sector and local communities, improvement in the efficiency of the existing Government apparatus, carefully planned reallocation of resources within the current sectoral budget envelope, and mobilization of external financing for incremental investments. The possible emergence of new mechanisms for the transfer of resources to support global environmental aspects of forestry should be carefully monitored to assess opportunities for additional resources for forestry development in Turkey.

³ State Forest Industry (ORUS) mills were privatized few years ago, and the privatization of the State Pulp and Paper Industry (SEKA), which buys almost 20 percent of the industrial wood production of OGM, is presently in process.

II. FOREST RESOURCES OF TURKEY

Forest Types

12. According to current forest inventories and management plans (1973-1999), Turkey's forest area is 20.7 million hectares; that is, about 27 percent of Turkey's land area. This area is under the direct control of the agencies of the Ministry of Forestry. Additionally, areas of significant size that are not designated as forest are technically and biologically equivalent to forests and, although outside the direct control of the Ministries of Forest, could be considered as part of the national forest resource.⁴

Table 1. Area of different forest types in Turkey

Forest Type	Tree Species	Forest Condition	Area		Tree growing stock		Current annual increment	
			(Ha.)	(%)	(m ³)	(%)	(m ³ /yr)	(%)
HIGH FOREST	Coniferous forest	Normal	5 955 120	28.8	720 990 975	61.8	18 998 826	58.6
		Degraded	3 937 335	19.0	45 150 167	3.9	954 895	2.9
		Total	9 892 455	47.8	766 141 142	65.7	19 953 721	61.5
	Broad-leaved for.	Normal	1 414 876	6.8	272 663 862	23.4	6 534 653	20.1
		Degraded	1 178 461	5.7	16 470 485	1.4	370 897	1.2
		Total	2 593 337	12.5	289 134 347	24.8	6 905 550	21.3
	Mixed forest	Normal	638 859	3.1				
		Degraded	720 525	3.5				
		Total	1 353 384	6.6				
	Total	Normal	8 002 855	38.7	993 654 837	85.2	25 533 479	78.7
		Degraded	5 836 321	28.2	61 620 652	5.3	1 325 792	4.1
		Total	13 839 176	66.9	1 055 275 489	90.5	26 859 271	82.8
COPPICE FOREST	Normal	2 545 132	12.3	83 990 250	7.2	4 871 155	15.0	
	Degraded	4 318 814	20.9	27 250 500	2.3	711 617	2.2	
	Total	6 863 946	33.2	111 240 750	9.5	5 582 772	17.2	
GRAND TOTAL	Normal	10 547 987	51.0	1 077 645 087	92.4	30 404 634	93.7	
	Degraded	10 155 135	49.0	88 871 152	7.6	2 037 409	6.3	
TOTAL		Total	20 703 122	100	1 166 516 239	100	32 442 043	100

Source : Turkey's Forest Inventory, OGM, 1999.

Conversion factor from stère to m³ is taken as 0.75.

13. Turkish forests contain a diversity of ecosystems ranging from well-stocked forests to depleted areas subject to severe natural limitations. Areas along the coastal regions, especially in the Black Sea region, have very favorable growing conditions for timber, where fast-growing plantations can achieve rates of growth up to 20 m³/ha/year, while large areas of oak forests in the interior of the country (with limited rainfall and hot, dry summers) produce no more than 2 m³ of timber per ha/year. Only about 50 percent of the forest area contains productive forest. Of this, about 8 million hectares are classified as productive high forest and about 2.5 million ha as productive coppice forest.

14. The forest area is nearly evenly divided between conifers and broadleaves. Conifers occupy more than two thirds of the high forests, while broadleaf species occupy about 20 percent and often

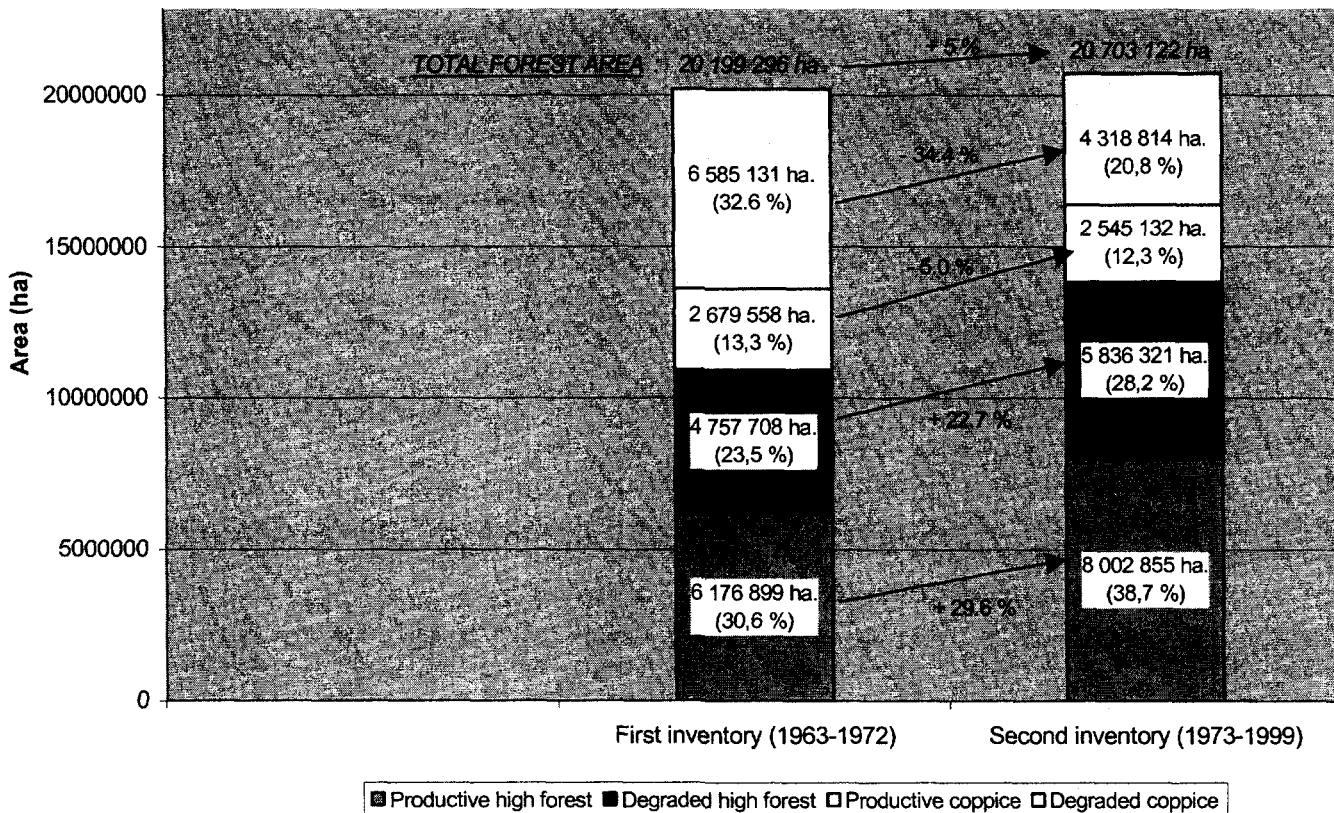
⁴ Turkey's actual forest area is about 15 million ha, almost entirely under the control of the Ministry of Forestry. However, rangeland, forest and shrub land altogether cover about 45 million ha in total, most of which is not under the Ministry of Forestry.

predominate in the mixed high forest as well. The coppice forest, a third of the forest area, contains a large variety of broad-leaved species although oak predominates. Except in limited areas of beech and oak along the Black Sea coastal region, broadleaves are not, in general, of good industrial quality. The principal species are *Fagus orientalis* (42 percent) and various oak species (25 percent).

15. Figure 1 (below) illustrates some broad trends in areas of different forest types over the last three decades. Part of the change is attributable to changes of definition of forest type; however, several important observations can be made:

- The total area of designated forest increased by 2.5 percent, corresponding to an increase of about 500,000 ha. (Most of this increase is the result of planting forest openings and of natural regeneration on lands abandoned as a result of out-migration.)
- The area of high forest increased by 27 percent while the area of coppice forests has correspondingly decreased. This change has three main causes: planting of coppice areas; beech coppice converted to high forest in large areas by improvement cuttings (some of this apparent change is due to changes in definitions); and afforestation of forest openings.
- The total area of degraded forest land has decreased by 10 percent: the area of degraded coppice forest decreased 34 percent and the area of degraded high forest increased 23 percent.

Figure 1. Breakdown of Total Forest Area by Forest Type at Two Inventories



Biodiversity

16. Turkey's diverse forest, steppe and wetland ecosystems contain vast and valuable biodiversity resources of global importance. With over 9,000 plant species, including 3,000 that are endemic, Turkey is possibly the most biologically diverse temperate country in the world. In addition to a wide variety of landraces of domestic species, several of Turkey's endemic plant species are wild relatives of important grain and pulse crop species (e.g., wheat, barley, lentils, chickpeas), fruits (e.g., cherries, apricots and figs), and ornamental flowers (e.g., tulip, crocus and anemone, etc.). Turkey's fauna include 28 species of mammal, 420 of bird, 345 of fish, 49 of lizard and 36 of snake. Indigenous mammal species include the forefather of the European fallow deer (*Cervus dama*), the bezoar ibex, chamois, and large carnivores including bear, wolf, jackal, and several species of wild cat including lynx. Plant and animal species are summarized in Annex 5.

17. Turkish forests contain a significant share of the country's biodiversity. Forest areas include the mixed temperate rain forests and alpine ecosystems of the Black Sea coast, the Mediterranean forest ecosystems in the western and southern regions, the transition forests between the coastal zones and inner areas, and the semi-arid/arid zone forest ecosystems, dominated by oak species, which cover large areas in the eastern and southeastern Anatolia regions. Forests in several regions include vestigial stands of remaining pristine forest ecosystems. In addition to many commercial timber species, Turkish forests also host a great number of other flora of economic importance, including various medicinal, aromatic, industrial and ornamental plants. Forests are also the major habitat for the rich diversity of fauna in Turkey. The wide distribution of forests over different regions of the country provides for genetic diversity within species, representing immeasurable ecological and economical value.

Growing Stock, Increment, Allowable Cut and Production

18. By the end of 1999, the total standing stock was estimated at 1.17 billion m³. The average volume, 56 m³/ha, appears low because of the large area of degraded, under-stocked forest. In the productive high forest, stocking is 125 m³/ha, just below the European average of about 130 m³/ha, while stocking in productive coppice forests averages 33 m³/ha. The estimated current annual growth for all Turkey's forests is 32.4 million m³. Comparison of the first forest inventory (1963-1972) and the second (1973-1999) shows an increase of about 25 percent in total growing stock and an increase of about 15 percent in total current volume increment. Despite the increase, the Ministry of Forestry reduced the allowable annual cut (AAC) 25 percent over the same period (from 22.8 to 17.2 million m³) to take into account illegal cuttings, to allow growing stock build-up in under-stocked stands and to expand conservation forests and protected areas. Production by OGM has recently stabilized at about 7.6 million m³ of industrial roundwood and 8 million m³ of fuel wood. If another 5-6 million m³ of illegal or unrecorded production is estimated,⁵ total production is about 21 million m³, which is about 11 million m³ below the annual increment, but about 4 million m³ above the AAC.

⁵ Since 1985, there has been no serious survey of or research on the volume of illicit cutting. Rough estimates are available from different sources, but they are not consistent. According to OGM, the volume of illicit cutting has been decreasing and is now about 5-6 million m³ annually.

19. Most roundwood produced is of low quality, as a result of decreasing areas of old growth and high-quality forest. The share of first and second quality wood was less than 5 percent in 1997; the remainder was third quality. The supply of high quality roundwood is far from meeting domestic demand. The average volume of wood imported annually has been about 1-2 million m³, mostly logs for the wood industry. Wood production in Turkey is highly skewed, with a modest area of fast-growing, short-rotation private plantations (most planted with poplar species) accounting for a large share of the total volume of production. This balance has important consequences in terms of the potential for future technological change.

Technological Change in Forestry – Potential Gains from Improved Tree Breeding

20. There is a worldwide trend to intensify wood production on small plantations areas while releasing natural forest lands for conservation and other uses. In Turkey, a trend toward intensification of wood production is underway on private plantations, where some 200,000 hectares of poplar plantations have an annual increment of about 3 million m³/year; that is, 15 m³/ha. This yield should be compared with that on public forest land, about 1.5 m³/ha. Moreover, recent research on *Pinus brutia* at the Southwest Anatolia Forest Research Institute suggests that breeding of improved trees through selection of superior genetic material could bring about volume gains of 30 percent (Isik, 1998).

21. Moreover, it appears that potential to increase production is being missed because large forest areas are under-stocked and under-utilized. This question is taken up in detail in Annex 2. Taking into consideration the potential productivity of areas that could be brought into forest production, as well as the increasing costs of operations on more difficult sites, that analysis concludes that it could be economically desirable for Turkey to approximately double the area under productive cover. The analysis considers the multiple potential domestic benefits to Turkey from a large scale reforestation program, as well as global benefits which would accrue internationally. It concludes that if weaknesses in the ways in which Turkey's forests and forest resources are valued by domestic resource users were removed, as well as defects in the market for forest land and management efforts, then approximately 6-7 million hectares of land would be brought under productive forest cover. Although this analysis was originally motivated by the assumption that massive and ongoing international transfers would be needed to overcome the various market imperfections, the results suggest instead that the aggregate value of the benefits to Turkish society are sufficient to justify nearly all of the cost of moving toward the globally optimal use of forest resources. The analysis shows that there is scope for international financial assistance with the initial investment costs of a large reforestation program. While these estimates are made on such an aggregated scale that they do not provide a guide for specific investment planning, they do suggest the enormous scope for forest resource expansion in Turkey and the large, and largely national, incentive for undertaking these investments.

Threats

22. Fire is one of the most important causes of damage to forest resources in Turkey. Between 1993 and 1997, about 2100 fires occurred annually, affecting an area of about 12,100 hectares. Actual fire fighting costs (investment and recurrent) have increased from US\$ 49 million in 1990 to US\$ 68 million in 1997, even though the number and extent of fires remained relatively constant over this time. Many fires are deliberately started by forest villagers protesting closure of land for reforestation

or other OGM activities. Accidental fires associated with the high incidence of tourist visitation is another significant cause of fire, especially in the Mediterranean coastal areas.

23. Fire is not the only threat to the forest. An estimated 11.8 million goats, 10.7 million sheep, 5.6 million cattle and 1.6 million other animals graze in forest lands. The great majority of these animals are supported by forest resources, because total pasture area is only about 1.5 million ha – far from adequate to meet these grazing requirements. Controlled grazing, range improvement, fodder production and stall feeding efforts and practices are lacking for reasons of tradition and economy. Heavy grazing can cause serious damage, particularly on forest regeneration sites and in degraded forest areas, and especially on steep slopes susceptible to soil erosion. Illicit wood cutting and encroachment for farming are among the other important causes of degradation and productivity decrease on forest land – the unrecorded cut is estimated at about 5-6 million m³ annually.

Forest Valuation

24. According to the State Statistics Institute, the direct economic contribution of forestry is a modest 0.8 percent of Turkey's GDP. A more realistic evaluation, however, estimates the sector's contribution at about 1.8 percent, considering the magnitude of unrecorded (sometimes illegal) production, as well as subsidies and incentives. Even this underestimates the significance of the sector to the national economy, because it does not include environmental and non-market functions of the forest. A recent study carried out under the Global Overlays Program (GOP) produced an economic valuation of these, with results as summarized in Table 2. Aggregation of these values provides a total value of nearly \$1.1 billion (\$61.5 per hectare) annually. These estimates, however, still understate forest values because: (i) only a partial analysis of many value components was possible (e.g., NWFP, wildlife, watershed protection functions, genetic resources); (ii) the potential value of many components (e.g., NWFP, eco-tourism, hunting and genetic resources) is likely to be significantly higher than the estimated value provided here – higher values could be realized if there were improvements in management, policies or institutional mechanisms; and (iii) many forest values are not included at all in the analysis, including research and education benefits, use of the forest for human habitat, regulation of water resources, micro-climate benefits, air pollution reduction, and the forest's nutrient cycling functions, and existence value.

25. Non-wood Forest Products (NWFPs) including fodder, resin, nuts, mushrooms, bulbous plants, herbs, water, game etc., make an especially significant contribution to the local and the national economy. Locally, fodder provided by free grazing and by cutting and carrying away for winter-feeding is the most economically important NWFP for village communities where livestock is a principal income source. This is especially true in remote, mountainous areas. On the national level, export revenue from NWFPs is estimated at about US\$70 million annually. Medicinal products are of particular importance; Turkey is one of the largest exporters of medicinal plants in the world. Many are exported as raw or semi-raw materials. The exact quantity of material harvested for export is unknown and is likely to be above the estimate. In total, the current economic value of NWFPs based on available information on export revenues, tariff revenues and benefits to local communities is \$110 million per year, about \$5.00 per hectare at a conservative estimate, and could be larger depending on how NWFPs are managed.

Table 2. Lower-Bound Estimates of Value of Environmental and Non-Market Forest Functions

Category	Total Annual Value (US\$/yr)	Annual Value per Hectare (US\$/ha/yr)
Non-Wood Forest Products	> 327,000,000	> 18.4
Wildlife	> 36,000,000	> 2.0
Recreation	> 2,000,000	> 0.1
Watershed Protection	> 131,000,000	> 7.4
Informal Fuel wood	> 40,000,000	> 2.2
Domestic Forest ¹ Subtotal	> 536,000,000	> 30.1
Carbon Storage	> 463,000,000	> 26
Genetic Resources	> 89,000,000	> 5.0
Global Forest ¹ Subtotal	> 1,088,000,000	> 61.1
Special Values Associated with Protected Areas	> 6,500,000	> 2.6 ²
Global Total	> 1,094,500,000	> 61.5

Source: Forestry Sector Review – Global Environmental Overlay Program Report, 1998.

Notes: 1/ The term "Forest" refers to the forested area excluding protected areas. The final "Global Total" does include those values which are specific to protected areas.

2/This value-only-indicates US\$ per hectare of the protected areas system; all others indicate US\$ per hectare of the entire forested area

26. Average annual industrial roundwood and fuel wood production by OGM from state-owned forests is at levels of 7-8 and 8 million m³ respectively. Because of the low quality of most of the wood produced, the average price and total revenue from wood production in state forests is quite low – total annual gross revenue from OGM's wood sales has been less than US\$500 million recently. In addition to production in state forests, a significant amount of wood (about 4 million m³) is produced in plantations of fast-growing tree species and in silvo-pastoral systems of private growers. At present, the total wood supply from state forests and private tree plantations does not meet domestic demand for industrial wood or for fuel wood. The supply deficit is met through illicit cuttings (mostly to meet fuel wood needs of forest village dwellers) and with imports of roundwood for industry (mostly logs). Illegal cuttings of fuel wood from the state forests may be about 5-6 million m³ annually, while the volume of wood imports is about 1-2 million m³ in recent years.

III. INSTITUTIONS OF THE FOREST SECTOR

27. **Ownership and Tenure Arrangements.** About 99.9 percent of forest lands and resources in Turkey belong to the state; the area of private forests is only about 20,000 ha. According to the Constitution of Turkey (Articles 169 and 170), the ownership of state forests cannot be transferred. State forest areas and resources are managed by the General Directorate of Forestry on behalf of the state.

28. According to current forest legislation,⁶ long-term allocation of degraded forest lands to local people or private investors for afforestation purposes is possible, provided that ownership of the land rests with the state and plantation activities are carried out in accordance with principles, guidelines and procedures set out by OGM. Revenue derived from such plantations may be used by the investor. Similarly, grazing permits can be provided to local communities on suitable forest land, subject to provision of appropriate grazing plans and continued supervision by state forestry staff. Despite these legislative provisions, the demand for land allocations for afforestation is very modest, and most grazing activity in forest areas continues without proper planning or rotational grazing efforts.

29. **Laws.** The current legal framework includes the forestry laws (i.e., the Forest Law, the Law for Supporting Development of Forest Villagers, the Organic Laws of the Ministry of Forestry and the General Directorate of Forests, the National Afforestation Mobilization Law, the National Parks Law), other related laws (i.e. the Environment Law, Range Law, Hunting Law, Tourism Encouragement Law, and Land Cadastre Law, and the Law for Protection of Cultural and Natural Assets) and various regulations concerning implementation of these laws.

30. Forest principles and policies stated in law are generally consistent with sustainable forestry practice. They aim at effective conservation of the existing forest resources, reforestation and reclamation of degraded forest land, contribution to the development of the living standard of forest dwellers, and planning and management of forest resources for multiple functions and benefits (environmental, social and economic) in the overall interest of society on a sustainable basis. However, most strategies, approaches and implementations actually undertaken do not conform to these principles and policies. Inadequacies are prominent in multipurpose planning and management and with regard to involvement of local communities and other stakeholders. For example, changes made to the legal definition of the forest have resulted in removal of large areas from the forest regime⁷, facilitated urban expansion and benefited influential groups or people encroaching on the forest. An important public debate on this subject concerns implementation of Article B of the Forest Law, according to which lands that lost their capacity and potential to be used as forest prior to 1981 can be removed from the forest regime and sold to the forest village households using them. About 450,000 ha of land have been identified under these criteria, and the process of removing this area from the forest regime and selling it is underway. Although removal of some areas from the forest

⁶ Forest Law, National Afforestation Mobilization Law.

⁷ According to the Special Expertise Report on Forestry (Section 2), prepared for the VIII Five Year Development Plan recently, the area of lands taken out of forest regime by changing forest definition in the Forest Law is about 1,456,000 ha.

regime is inevitable (e.g., in the areas on which large settlements are already established), implementation of Article 2B is opposed by some stakeholders who hold the view that it rewards encroachment on forest land and encourages new encroachment, and moreover, that the main beneficiaries of this procedure are in many cases elites undertaking urban expansion into forests around large cities, such as Istanbul, rather than poor forest village dwellers. A further issue surrounds legislative provisions for long-term allocation of forest lands to individuals or entities for non-forestry uses in the public interest (e.g., tourism and mining). Implementation of these provisions is also criticized by many stakeholders, who believe that it serves the interest of influential groups (e.g., owners of large tourism installations) who are allocated valuable lands for long periods (49-99 years) at charges far below market value.

31. Inadequacies in the other laws (i.e. Tourism Encouragement Law, Range Law, Environment Law, Hunting Law, Tourism Encouragement Law) and conflicts and gaps between them and the forest legislation are among the important shortcomings of the legal framework. Lack of adequate sanctions in some laws (i.e. National Afforestation Mobilization Law, The Law for Supporting Development of Forest Villagers) are also important deficiencies. Finally, there is a need to revise and improve forest legislation to adapt the commitments of Turkey to international conventions and processes.

32. **Institutional Framework.** The Ministry of Forestry (MOF) is responsible for conservation, development, planning, management and utilization of forest resources. The central-level organization of the MOF comprises a Research Planning and Coordination Board; the Directorate for Forests (OGM); the General Directorate of Reforestation and Erosion Control (AGM); the General Directorate of National Parks, Game and Wildlife (MPG); and the General Directorate for Forest Village Relations (ORKÖY); and other units undertaking coordination, personnel, consultancy, finance, legal-advisory and public relations works.

33. OGM manages almost all forest land resources in Turkey, undertaking forest protection works (against fire, illegal cuttings, encroachment, insects and diseases, etc.), silvicultural works for forest regeneration and improvement, road construction and maintenance, cadastral surveys, management planning, production and marketing of wood and other forest products. AGM⁸ manages areas designated for reforestation, erosion control and range improvement. MPG is responsible for nature parks, nature reserves, national parks, nature monuments and recreation forest areas, 1.7 percent of the total forest area. Additional wildlife reserves covering about 1.8 million ha, mostly on forest land, have been identified and are to be managed by MPG, but are currently managed by OGM under classical forest management plans, pending development of planning and management by MPG. Additional conservation sites (forest seed stands, gene conservation forests, gene management zones) are the responsibility of the Forest Tree Institute. (When these areas and the conservation and protection forests under OGM are considered in addition to the areas MPG manages, the total area of protected/conservation areas is about 3.6 million ha, about 17.3 percent of the total forest area.)

⁸ Once plantations have reached "biological independence", usually at about ten years of age, they are transferred to OGM, which integrates the areas into its standard operations. AGM has so far completed reforestation, erosion control and range improvement activities on approximately 2.3 million ha (1.8 million ha reforestation; .4 million ha erosion control; .1 million ha pasture improvement). According to AGM's surveys, about 4 million ha remains in its work program on degraded forest lands. It should be noted that AGM works on lands outside the forest regime as well, particularly to undertake erosion control measures.

Finally, ORKÖY is responsible for providing some support to forest communities (about 2 million households and over 7 million people) living within or adjacent to forest areas.

34. At the field level, the MOF has two separate regional organizations, one for OGM and another for the other general directorates: OGM's field activities are implemented by 27 regional forestry directorates, 245 forest district directorates and about 1,300 forest chief units, while the field activities of AGM, MPG and ORKÖY are implemented by nine ministerial regional directorates with chief engineers, engineer units, national parks and nursery directorates under them. Outside these two regional structures, an additional nine forest research directorates and eight forest soil laboratories in the field relate directly to Ministry headquarters. The present staff of the ministry comprises 3,813 forest engineers, 8,196 forest guards, 11,513 other staff (professional and administrative staff), 3,097 permanent workers and 16,900 temporary workers (in total, 43,519 staff).

35. The MOF is excessively compartmentalized, creating difficulties in coordination and cooperation among different activities. This is particularly apparent at the field level, where the MOF's activities are carried out under the two separate regional structures just noted. This structure appears to be a leading reason for the MOF's high administrative expenditures and overhead costs, and is also a cause of weaknesses in multipurpose and participatory management of forest resources. Other important organizational deficiencies include over-centralization of authority and responsibility, frequent changes in staff assignments, and the concentration of a large number of personnel at central units in Ankara and regional headquarters while many field implementation units are vacant.

36. Non-MOF forest sector institutions include forest village cooperatives and unions, nine forestry faculties, NGOs, and forest industries (of which the majority belong to the private sector). Cooperation and collaboration between MOF and these other institutions is inadequate and needs strengthening. The sector's collaboration with other relevant institutions (e.g., Ministry of Environment, Ministry of Agriculture and Rural Affairs, State Water Works, Ministry of Tourism, Ministry of Education, local administrations, other universities and the media) is also in need of improvement. Moreover, forest village institutions are weak in undertaking joint action towards the solution of their own problems, addressing poverty alleviation or sustainable management and rational utilization of shared natural resources within the village boundaries. Village cooperatives are not successful in making use of their revenue to create significant income or employment opportunities for their villager members (lack of village budget is, however, a distinct constraint on collaborative action in forest villages). These issues deserve special attention in institutional development initiatives to be undertaken for the development of forestry sector.

37. **Research.** Research should play an important role in addressing issues faced by the forestry sector in Turkey. Forestry research is presently being undertaken by the nine regional forestry research directorates noted above and nine forestry faculties. Traditionally, forestry research has concentrated on technical topics, such as silviculture, nursery and reforestation techniques, breeding, etc. However, current challenges require increased emphasis on socio-economic and environmental issues, including biodiversity, forest village development, community forestry and participation, development of agro-silvo-pastoral systems, non-wood products, recreation, amenity, forest valuation, multipurpose management and utilization of forest resources, trends in demands for wood and non-wood products and services, protected areas, wildlife, eco-tourism, hunting, pasture improvement and management, finance and economics. These needs are recognized in the recently-prepared Forestry Research Master Plan as well as in the Special Forestry Reports of the Five Year Development Plan. The interest and

involvement of researchers in these topics has increased during recent years, but at present it is still inadequate. Not only research but also education needs strengthening on these issues. Collaboration between researchers, implementation units and other stakeholders (including NGOs) is needed.

38. Participation. Management planning of forests and protected areas are regarded in the relevant legislation as technocratic disciplines, reserved exclusively to the responsible authorities. Where management plans for protected forests are prepared by the forest administration, there is limited consultation with other authorities or with affected local residents and other stakeholders. Consultation of the concerned people is not envisaged prior to declaration of protected areas, nor for the adoption of forest management plans. There may even be institutional conflicts, because the applicable legislation vests three ministries (Forestry, Environment and Culture) with similar responsibilities and does not provide for their coordination. Recently-adopted legislation regarding grazing does not constitute a significant innovation in this direction, since it does not provide for the preparation of integrated management plans, or for adequate consultation of the concerned people. Despite these legal and institutional constraints, Turkey is making progress in piloting mechanisms for institutional collaboration and stakeholder participation in natural resource management and conservation. In particular, experience provided under the Eastern Anatolia Watershed Rehabilitation Project, and the Biodiversity Conservation and Natural Resources Management Project may provide examples of approaches that could be applied more broadly. (See Box 2 below).

Box 1. Stakeholder Consultation

A workshop held in Turkey in July 2000 presented the Bank's initial findings to stakeholders and to obtain input concerning sectoral priorities. Representatives of interested Turkish and international NGOs in attendance presented the following action priorities:

- Develop a program for public awareness and political support for sustainable forest management.
- Establish an appropriate legal and institutional framework (including legislation and regulations).
- Establish a policy for eco-tourism that protects our environment.
- Develop a methodology for multi-purpose forestry planning.
- Develop a mechanism for effective biodiversity planning and management.
- Develop an integrated and participatory watershed development plan.
- Develop a mechanism to raise income levels of forest villagers above poverty levels while conserving the surrounding environment.
- Establish sustainable forest management that will maximize the social, economic, and environment benefits for the Turkish people.

39. The lack of a legal framework for integrated, participatory agro-silvo-pastoral management is partly the result of Constitutional provisions noted above which give the state the exclusive right to manage and exploit natural resources (Art. 169). The Constitution does not prohibit the delegation of these functions; this may be specified by an act of Parliament, and in fact forest villagers have already been involved in forest harvesting and have had other limited utilization rights. But many interpret the Constitution's provision as excluding involvement by parties other than the State in forest resource management. This interpretation hampers the involvement of forest communities and other stakeholders in forest management (it likewise hampers privatization of the forestry sector).

Box 2. Biodiversity Conservation and Natural Resources Management Project (2000)
Cost US\$11.5 Million
GEF Grant US\$8.3 Million

This GEF financed project became effective in mid year 2000 and is implemented by the Ministry of Forestry in collaboration with the Ministries of Environment and Culture, together with other key stakeholders.

Over a period of six years, the project aims to establish effective participatory systems for sustainable conservation and natural resource management at four pilot sites selected from each of Turkey's four main bio-geographic zones, and will build the national capacity and public support to catalyze replication of this experience to develop a nationwide network of protected areas.

It will also review the legal and regulatory framework for biodiversity conservation and explore opportunities for mainstreaming biodiversity conservation in forest management planning, local land use planning, tourism development, agricultural extension, and environmental management of water systems.

Project sites include:

- Caucasian mixed temperate rain forest and high alpine meadows of the north east Black Sea coast.
- Mediterranean forests of the Taurus mountains.
- Alluvial forests and associated wetlands of the western Black Sea region.
- Steppe and wetland ecosystems of central Anatolia.

Sites were selected so as to include biodiversity conservation and natural resource management challenges that are common to many areas of Turkey and, thereby, provide practical experience to support effective implementation of the national biodiversity conservation strategy and establishment of sustainable natural resource management more broadly.

IV. CHALLENGES FACING TURKISH FORESTRY

40. While there are an enormous number of operational issues that must be managed on an ongoing basis, the Government of Turkey's response to four principal challenges – poverty in forest areas, the need to rationalize forest management and operations, soil erosion, and threats to the sector's financial viability – will determine how well Turkey's forest resources can contribute to overall national development.

Poverty in Forest Areas⁹

41. The most significant social issue in Turkish forestry is the plight of forest villages. Forest villagers are significantly worse off than the rural average in Turkey and far below the national average (see Table 3). They comprise approximately 15 percent of Turkey's total population¹⁰ and about half its rural population. Between 1975 and 1990, the population of about 95 percent of forest villages declined, largely due to out-migration. The most important cause of out-migration was poverty, experienced both in terms of wealth and income and also in terms of inadequate infrastructure and social services.¹¹

42. Forest village households rely mostly on farming, livestock raising and horticulture; as a result, land ownership is a crucial determinant of income. In mountain villages where land for agriculture and pasture is severely limited, poverty is particularly pronounced. The Social Assessment study undertaken as part of this FSR found that only 25 decares of land is available per household in forest villages, while the average for rural households in Turkey is 64 decares. The proximity of the forest does provide some benefits: 57 percent of villagers are completely dependent on wood for heating, and about half of these are dependent on wood for cooking as well. However, only 8 percent of villagers

⁹ This section draws heavily on a Social Assessment (SA) commissioned specially for this review and conducted in 1997 under the direction of the World Bank ECA/MNA Social Team. The SA was carried out in three regions of Turkey –Mediterranean, Aegean and the Black Sea – and addressed 60 percent of the people living in forest communities. The SA derived its empirical findings from several sources, which included a household survey and focus groups and in-depth interviews with community representatives, governors, village headmen, cooperative managers, financial institution representatives, forest sector employees, government agency representatives, members of the private sector, forest managers, forest security forces. Additional details on the survey methodology and results can be obtained from that report.

¹⁰ Figures from the 1997 census results are as follows: 2.5 million people live in 7,282 in-forest villages and 4.6 million people in 11,738 forest-neighboring villages. The total number of villages that are in-forest or forest-neighboring is 19,020; their population 7.1 million; the total number of households in these villages about 2 million (*Forestry Special Expertise Report for VIIIth Five Year Development Plan, SPO, 2000*). The actual number of rural settlements in the forest areas is much larger than the number of villages, since one village often comprises several settlement sites.

¹¹ As a result of high rates of out-migration skewed toward young people, the elderly now make up 14 percent of the total forest village population. Since most migrants are men, there is a disproportionately high female population in forest villages. While overall only 9 percent of household heads are female, research for this review found that 24 percent of families in forest villages have female heads. Further, as more men work outside the village, women take over timber harvesting and other traditional male activities. This is especially significant as women perceive that they obtain more benefits from the forest than men and, as a result, attach greater value to it.

earn their living by working in forest related sectors, and many who are unable to engage in agriculture and/or livestock raising are forced to migrate.

**Table 3. Household Income in Turkey
(USD/Year)**

Estimate	Turkey Overall	Turkey Rural	Black Sea		Mediterranean		Aegean	
			Rural	Forest	Rural	Forest	Rural	Forest
State Statistical Office	4,734	3,594	3,520	1,961	3,506	1,746	3,795	2,564
Social Assessment				1,965		1,837		2,647

Sources: Adapted from Turkey Forest Sector Review Social Assessment, 1998, and Social State Statistical Office, Household Survey, 1997.

43. The Government has responded to the problem of poverty in forest villages in a variety of ways For example:

- Providing subsidized distribution of forest products and credit through ORKÖY, its General Directorate for Forest Village Relations.
- Supporting participatory approaches to watershed rehabilitation, focusing to date on South Eastern Turkey.
- Piloting increased community participation in protected area management.

44. The field programs of ORKÖY include provision of subsidized credit for a range of income generating activities (bee-keeping, livestock development, fish farming) as well as some wood-saving programs (e.g., efficient stoves, house isolation). The ORKÖY approach, which was a pioneering strategy that achieved some success¹² when first introduced in the 1970s, has proven limited in the long term. There are consistent budgetary and institutional shortfalls. Interventions are not as effective as they could be in helping the poorest of the poor or in changing the incentives of those who most threaten sustainable resource management. Moreover, the system has evolved a costly and centrally-dominated General Directorate.

45. In addition to the activities of ORKÖY, policies and practices by forestry agencies are intended to benefit forest villagers through preferential employment in forest works (i.e. harvest and transport of wood) and through provision of fuel wood and roundwood at subsidized prices. The annual payment made by OGM for wood harvesting and transport operations (mostly to forest villagers) is more than US\$ 170 million. About 0.5 million m³ roundwood and 4-5 million m³ fuel wood are also provided to forest village households and cooperatives annually at subsidized prices, and in accordance with the provisions of the Forest Law. These volumes correspond to about 7 percent of roundwood and 60 percent of fuel wood production, or 30 percent of total wood production from the state forest by OGM. These preferences serve to politicize forest policy and make the pursuit of efficiency in forest

¹² ORKÖY was established because other government agencies' contributions to development of mountain and forest villages have traditionally been inadequate, due to the remoteness and limited agricultural resources of these villages as well as a lack of agency attention to critical issues such as poverty, migration and natural resources degradation. Some villagers affirm that the ORKÖY interventions in the 1970s had some successes and made an important contribution to forest villages.

management hostage to local welfare concerns and political pressures, while the employment and income benefits which OGM can provide through preferences to forest villagers are still far from being adequate to meet local economic needs.

46. In the past, it has been believed that subsidized wood sales, employment in wood harvesting operations and ORKÖY credits provided an important contribution to the living of forest-village households. But analysis based on MOF figures confirms that the per household value of all these contributions is modest. The inability of villagers to generate livelihoods from forest management has led to indifference toward conservation or forest development, and efforts to sustain livelihoods often come at the cost of serious natural resource degradation and abuse.

47. To better serve the rural poor Government should encourage decentralization of development services to the general local administration and promote micro-credit schemes managed by NGOs¹³ and by integrated (multi-sectoral) rural development works of relevant agencies. Consideration should be given to focusing ORKÖY on analytic and advocacy functions, in which it builds a better understanding of poverty and development potentials in forest villages. ORKÖY could more strategically catalyze sustainable - forest friendly – economic development in a variety of ways, for example: providing advisory services to villagers on opportunities such as participation in standing sales being promoted by OGM; developing small industry, eco-tourism, hunting tourism and management; processing and marketing of non-wood forest products; use of water resources; etc. Additionally ORKÖY could more effectively develop partnerships with other departments of MOF and with other agencies involved in delivering services to poor, near forest, populations, and could also take an active role in the incorporation of local needs and socio-economic issues into an integrated forest management planning process.

48. **Participation.** A large number of stakeholders have an important influence the forestry sector, these include farmers and grazers, large parastatal wood-consuming industries, urban dwellers, the tourism and hunting sectors, and environmental interest groups. Demands and expectations of the various stakeholder groups are inadequately rationalized by the current forest sector management systems, and this occasionally leads to conflict, inefficiencies and unsustainable practices. Some stakeholder proposals, such as urban expansion into forest areas, restriction of logging operations or expansion into protected areas, may put their proponents into conflict with forest villagers, while other uses, such as eco-tourism, hunting and forest recreation, could generate income in forest villages. Major stakeholder groups should be encouraged to participate in transparent priority-setting, reconciling competitive uses of forest resources by different stakeholders and developing forest management plans. Current proposals to amend forestry legislation, envisaging the involvement of village communities in forest conservation and management, are a positive development in the direction of participatory management. It would be helpful to clarify basic elements of management

¹³ There are many non-governmental organizations involved in different key fields of the forestry sector, including conservation of biodiversity and natural resources, combating soil erosion, and promoting rural development. In many cases, they play a significant role in preventing the destruction of the resource base and making forest villagers' concerns public. These groups include the Turkish Development Foundation; the Turkish Erosion Combating, Afforestation and Natural Resources Conservation Foundation; the Association for the Protection of Natural Resources; the Association for Investigation of the Rural Environment and Forestry Problems; the Turkish Association for the Conservation of Nature; and the Turkish Environment Foundation.

plans/agreements to be entered into by a participating village and the forestry administration. The clarification should specify the respective obligations of the parties (for example, the forest improvement works to be carried out by the village, and the assistance to be provided by the administration), their rights (such as the right to harvest forest produce where the specified conditions have been met), and the consequences of failure to comply with the agreements. The law could require that these specifications be incorporated in the text of the agreements and management plans.

49. Ongoing state/private sector cooperation in forest resource management (e.g., contracting the implementation of forestry works to private firms, including forest inventory, management planning, road construction, reforestation, harvesting, transportation, and erosion control activities) can provide good examples of how responsibility can be shared between the state, the private sector, and civil society. Further, the forestry sector would greatly benefit from an effort by the Government to seek more aggressively to incorporate lessons of best practice, taken from within Turkey or elsewhere, concerning integration of tenure and resource-access reform into management of forest resources. By providing a framework in which local populations can benefit from investments in improved resource management, Government could be much more effective at combining poverty alleviation and environmental enhancement.

50. Finally, strengthening of village institutions and in-village collaboration on initiatives to solve village problems should be given special attention in rural development programs and efforts.

51. With respect to poverty in forest villages, the challenge is to:

- Assist in the development of the poorest forest villages, through integrated rural development interventions, rather than focusing only on forest-sector related solutions;
- Explore interventions to enhance income potentials offered by the forest flora and fauna, mainstreaming best practice that results from the initiatives that are being piloted under ongoing projects such as GEF financed Biodiversity Conservation and Natural Resource Management Project and the Eastern Anatolia Watershed Rehabilitation Project
- Ensure that forest revenues are shared with forest communities on a more equitable basis.

Cadastral Surveys and Border Determination Works for Forest Lands

52. Cadastral surveys and border determination has not yet been undertaken for large areas of Turkish forest lands. Forest borders and areas shown in the management plans are based on the forest inventories, and do not depict ownership boundaries. Vague ownership boundaries are at the root of numerous, multiplying disputes. Field works of several major forestry programs (e.g. reforestation, soil conservation) as well as appropriate utilization of some pasture or agricultural lands by forest villagers are seriously constrained by border and land tenure disputes. Thousands of ownership dispute cases are currently with the courts. Further complicating the matter, frequent changes made to the legal definition of the forest tend to be followed by removal of large areas from forest regime, necessitating renewal of cadastral surveys on many sites and creating additional tenure disputes. Many stakeholders believe that these changes serve rapid urban expansion into forest areas, and are undertaken in the interest of elites rather than local rural populations or the public interest. In this context, completion of forest cadastral surveys and settlement of ownership disputes are priority challenges of the Turkish

forestry sector and a prerequisite for forest management. Establishment of an appropriate legal framework will be of great importance for this purpose.

Box 3. Eastern Anatolia Watershed Rehabilitation Project (1993)

Cost US\$115 Million

Loan US\$70 Million

Under the project, local populations and different Government agencies jointly plan and implement watershed development and management activities that combine poverty alleviation and natural resource rehabilitation and development.

The project has two principal objectives: Restoring sustainable land-use management to degraded watersheds in three provinces of the Upper Euphrates River Basin; and increasing the incomes of the local populations living in these areas, among the poorest in Turkey.

The project introduced two institutional and behavioral innovations: (i) Provincial sectoral agencies (agriculture, forestry and small-scale irrigation) worked together on an integrated basis in small watersheds; and (ii) watershed rehabilitation programs were developed and implemented with the participation of local people.

To date the project has reached about 400,000 people living in more than 50 watersheds. Integrated management plans have been prepared, including improved management and cultivation of fodder, reforestation, soil conservation, improved arable farming and fruit farming, construction of ponds for supplementary irrigation, bee-keeping and gully protection.

The project has strong support at both the local and national levels. Since initiating the project, its approach has been extended to six more provinces in southern and south-eastern Turkey and will now be adopted in up to 20 more provinces in a follow-up operation. The project has benefited from a high degree of local commitment (it increased local empowerment). It has improved development opportunities and access to resources through targeted interventions, has been cost-effective and sustainable, despite a difficult macro-economic environment. A natural resources and poverty reduction project using a similar participatory approach is under preparation in Armenia.

The Eastern Anatolia Watershed Rehabilitation project was modest in its objectives, a feature that may have contributed to its success. Its experience shows, however, that a long-term commitment to interventions of this type is necessary in order to ensure success. A detailed description of the project is in Annex 6.

53. With respect to tenure disputes on forest lands, the challenge is to:

- Settle disputes and promote community-building;
- Ensure that forest policy is equitable in its effects;
- Promote community-building and trust through transparent land use management;
- Control threats to the forest from urban expansion.

Improving Multi-Purpose Forest Resource Management Planning and Operations

54. Presently, forest planning is undertaken by several different departments of the MOF. Linkages and cooperation among different plans prepared by different departments are insufficient. The existing roles of the four MOF general directorates with respect to forest management planning are as follows:

55. OGM. Forest management plans prepared and implemented by OGM¹⁴ aim principally at conservation of the existing forest resources and at development of forest tree vegetation (i.e. improving wood growing stock, age and diameter class distribution, wood quality) and adequate wood production. Forest inventories with this purpose concentrate exclusively on trees, providing insufficient attention to other resources and functions of forests. Most observers have concluded that from the perspective of conventional timber production, forestry practices in Turkey are generally technically sound and well developed. However, because forest management planning is highly centralized and basically single-purposed, forestry operations are inclined to be standardized, high cost and inflexibly applied. To keep up with its schedule, OGM must prepare forest management plans for 2 million hectares a year, while currently it can handle only 1.5 million hectares due to lack of specialized staff, shortage of vehicles and budget constraints. Some plans have been contracted out to private companies, but the cost is generally higher (\$ 4 to 5 per hectare compared to OGM's cost of \$3 per hectare).

56. MPG. For national parks and protected areas, management plans are prepared and implemented by MPG, in accordance with the National Parks Law. However, these plans have so far been developed for only a small fraction of the designated protected areas. Wildlife resources inventories and specific management plans have not yet been completed to cover the wildlife reserves – about 1.8 million ha, mostly on forest lands. Moreover, plans fall short in sustainable management practices, particularly with respect to involvement of local people and other relevant stakeholders.

57. ORKÖY. Forest village development plans are prepared by ORKÖY¹⁵. These concentrate on small-scale income-generation activities, and do not establish linkages with development and conservation of natural resources. Further, most of the existing forest village development plans of ORKÖY were prepared during 1974-1984, and are now outdated.

58. AGM. Reforestation, erosion control and pasture improvement plans and projects, prepared by AGM, have some inadequacies with regard to socio-economic, biodiversity and environmental impact aspects. However, during recent years significant progress is being made in the preparation and implementation of integrated/participatory watershed development plans under the Eastern Anatolia Watershed Rehabilitation Project. The project is summarized in Box 3 and described in more detail in Annex 6.

59. Forest management plans prepared and implemented by OGM continue to be the basic plans for most forestry activities and interventions. For this reason, despite recognition of the multiple dimensions of forest resources, Turkish forestry continues to be dominated by a rather narrow emphasis on forest tree resources and sustained wood yield. Although attention to the conservation functions of forests has been growing (about 3 million ha of forest area has been assigned as conservation forests in the new plans prepared by OGM during last decade), according to current management plans 83 percent of the forest area is managed with wood production as the main objective and only 17 percent is assigned to other primary uses, mostly to protection of soil and water

¹⁴ The first set of management plans, covering all forest areas, was prepared by OGM in 1963-1972. Since then, revised plans have been completed for the great majority of forest areas.

¹⁵ 532 district level rural development plans, covering 17 797 forest villages, were prepared by ORKÖY during 1974-1984 period. Since then, updating of plans has been possible for only small fraction of forest villages.

resources and also to biodiversity. This strong focus on wood production does not fully take into account the rapidly growing "new" demands for forest recreation, nature conservation and other forest values; recognition of the need for greater sensitivity to the needs of poor rural populations for fuel wood, forest-based grazing and fodder, non-wood forest products and employment; or commitments by Government to globally significant forest values under arrangements such as the Conventions on Biodiversity, Desertification, Climate Change, and Conservation of Wetlands (Ramsar). Adequate studies and information on the demands for such multiple functions and benefits, the potential of forest areas and resources (soil, water, flora, fauna, biodiversity), valuation of non-wood benefits, participatory approaches to evoke the involvement of different stakeholders – particularly local communities – are prerequisite for the development of multipurpose planning and management of forest resources.

60. There is a need to develop a vision for managing the sector as a whole that addresses present and future requirements, identifying smaller areas requiring intensive management for wood production and larger areas that will be jointly managed with rural communities. It will be necessary to decentralize forest management planning and revise guidelines in ways that would encourage greater attention to wildlife, environmental values, cost-benefit considerations and local needs and preferences. Multiple purpose forest management is now the norm in many countries and guidelines could be adapted to Turkish conditions. Annex 3 proposes a pilot planning operation which could both introduce multi-purpose participatory planning and help to identify specific legal, regulatory and skill constraint to its development and application in Turkey. Such an effort could be conducted at modest cost in association to follow up to this Review.

An approach to involving local stakeholders in multi-sectoral planning and management of natural resources that has been successful under the Eastern Anatolian Watershed Rehabilitation Project and community outreach initiatives being piloted under the GEF financed Biodiversity Conservation and Natural Resource Management Project, may provide valuable experience that could be applied more broadly in establishing systems for local stakeholder participation in the planning and management of forest resources.

61. With respect to forest management planning, the challenge is to:

- Protect all forest values, ensuring the sustainability of all forest products and services;
- Make best use of forest agency resources through improved inter-agency linkages and integration of forest planning functions;
- Promote participation of local communities and other relevant stakeholders in forest planning and management.

Controlling Soil Erosion and Reclaiming Degraded Lands

62. Soil erosion occurs in about 75 percent of Turkey's land area, and may consequently constitute one of the most serious environmental problem in Turkey. According to surveys, the amount of soil carried off by erosion is more than 500 million tons annually, of which 350 million tons is carried by rivers and streams into dam reservoirs, interfering with their vital functions in the energy, irrigation and agriculture sectors. Damage from frequent floods, which take lives and degrades agricultural lands and infrastructure, is also very serious. In light of these issues, many stakeholders see erosion control

through reforestation and reclamation of large areas of degraded lands as the priority role of forestry in Turkey, and that the economic value of lands managed for erosion control can be augmented with non-timber values, undertaking instead the production of various non-wood products and services for local, national and global benefits. At the same time, it is apparent that establishment of industrial forest plantations on suitable sites on degraded lands would help to meet domestic wood demand, reducing pressure for wood production from natural forest areas carrying other, more important values.

63. While erosion control activities are underway, there are several institutional issues that hinder these from being as effective as possible. One is the division of labor between the General Directorate for Forestry (OGM) and the General Directorate for Afforestation (AGM). A key institutional issue is the assignment of responsibility for planting and early maintenance of stands to AGM while OGM assumes control after establishment through to the harvest. This allocation of effort is based on the premise that the technical functions of forest management can be separated independent of budgetary and other incentives and on the assumption that public agencies should have a monopoly on the management of mature stands. Experience in other countries, most notably New Zealand, where the management of virtually the entire public plantation has been privatized (while the State retains full ownership of forest land) could provide lessons that could be adapted for Turkish conditions.

64. A further institutional issue is cooperation on watershed management. To realize maximum benefits, an integrated approach to forest management should extend to the management of watersheds, for erosion control and other purposes. Although there is inadequate provision in Turkish legislation to integrate the works of relevant government agencies – MOF, Ministry of Agriculture and Rural Affairs (MARA), Rural Services, State Water Works (DSI) – Turkey has undertaken impressive programs at the local level where these agencies do work together. Cooperation has included the active involvement of local communities, NGOs and other institutions in planning, rehabilitation and management of watershed areas.

65. Another issue is how to make use of the enormous opportunities for combining rural poverty alleviation with soil conservation and for involving the private sector. Various legal and financial support mechanisms have been introduced and implemented to promote private sector and rural community involvement in afforestation/reclamation activities on degraded lands in Turkey. According to the current Forest Law (enacted in 1957) and recently introduced (1995) National Afforestation Mobilization Law, degraded forest or non-forest state lands can be allocated to local communities, individuals or private companies for afforestation purposes. On suitable lands plantation of non-forest tree species and rehabilitation and utilization of non-wood products (i.e. bay leaf, thyme) is also permitted on a limited scale. Such activities are also supported by low-interest credits from the AGM Fund established for this purpose. However, to date, these arrangements have not been effective in involving local people, private sector and other institutions in soil conservation and afforestation activities. The apparent reasons for this include the low profitability of forest plantation investments and the long waiting period for returns; lack of confidence in the state; the difficulty of land allocation and credit access procedures; and inadequacy of financial resources. At the same time, international experience strongly cautions against heavy reliance on subsidized approaches, as well as against direct implementation of tree planting or conservation works by government agencies. These approaches are rarely found technically efficient or financially sustainable, while incentives such as security of access, assistance with planning and conditional land allocation may be more effective.

66. The participatory/integrated watershed rehabilitation model, combining rural development with erosion control and natural resources rehabilitation implementations, has achieved considerable progress under the Eastern Watershed Rehabilitation Project. However, under this model, while local communities have participated actively in rural development and income generation activities, most afforestation and other rehabilitation activities have been implemented by AGM and significant budget resources have been allocated for this purpose. Similarly, strong financial support has also been provided by the other government agencies for income generation and rural development activities on the project sites. This experience should be taken into account in designing community based reforestation and natural resources rehabilitation models for degraded forest areas.

67. With respect to controlling resource degradation, the challenge is to:

- Realize the economic benefits of sustainable forest management;
- Realize the benefits to forest villagers of association with efforts to promote sustainable management of the lands from which they too draw their living.

Restoring the Sector's Financial Viability

68. The different forestry departments are financed from a variety of complex and overlapping sources. While timber sales were once a major source of revenues for OGM, these revenues have declined, especially following the removal of the tariff barrier and subsequent drop in wood prices. Environmentally sustainable management now is increasingly a charge on the national budget. The sector's financing arrangements should be adjusted in order to ensure optimal management of Turkey's forest resources.

69. OGM's sales of wood and non-wood products are the sector's primary source of revenue. The significance of OGM's wood sales can be seen in Table 4, and Annex 4 outlines the sector's overall financial flows. Until 1993, revenue from wood sales was relatively protected, because OGM operated as monopolist behind a high customs wall; duties on imported wood that year amounted to 20 percent. But in 1993, following the Customs Union Agreement with the EU, duties on imported wood were abolished. Since then imported wood has appeared in the domestic market in increasing volume, recently more than 1.5 million m³ annually, approximately 10 percent of total consumption. The sale price of Turkey's wood has correspondingly declined: prices of roundwood sold by OGM dropped by approximately 30 to 40 percent from 1993 to 1999 in real terms. This trend has had a critical effect on OGM's revenue from wood sales; the drop in price of logs is especially significant, because sale of logs is the main source of OGM revenue. Revenue has also been decreasing as a result of decreasing dimension and quality of its wood production¹⁶ and because of the increasing use of wood-substitute materials.

¹⁶ As a result of the decreasing area of old and high quality forests, the volume of log production has decreased from five million m³ to about three million m³ in the last 20 years. Most of the roundwood now produced is low quality (e.g., in 1997, the share of first and second quality wood was under 5 percent while the rest was third quality). Since the price depends strongly on the quality of the wood, the total revenue from a nearly constant volume of roundwood has decreased significantly in recent years.

Table 4. Consolidated Income Statement of OGM, 1996-1998
(US\$ million)

REVENUES	1996	1997	1998 *
Wood Sales	547.6	469.9	426.9
Other revenues	96.0	38.7	38.5
Treasury Contribution	67.8	81.5	42.3
Total Income (1)	711.3	590.1	507.7
EXPENDITURES			
Wood Harvesting and Transport	222.4	187.8	169.4
Wood Sales	5.3	1.5	2.6
Stocks Value	34.0	35.0	0.0
Cadastral Service	1.1	1.4	1.9
Forest Maintenance Expenditure	124.4	139.1	114.7
General Administrative Expenditures	226.1	250.0	209.2
Repair Units	7.1	0.0	0.0
Auxiliary Services	9.4	0.0	0.0
Other Expenditures	0.5	6.1	9.9
Total Expenditures (2)	629.3	619.5	505.9
Gross Balance in Operations (1 - 2) = (3)	82.1	-29.5	1.8
Depreciation Allowances (4)	4.9	3.6	2.3
Net Balance in Operations (3 - 4) = (5)	77.1	-33.1	-0.5
AGM Fund (6)	23.9	19.6	20.1
ORKÖY Fund (7)	0.1	0.0	0.0
Net Balance after AGM and ORKÖY Funding (5 - 6 - 7) = (8)	53.1	-52.6	-20.5
Treasury Share (9)	57.5	48.7	19.2
National Defense Fund (10)	0.0	0.0	0.0
Income or Loss Before Profit Tax (8 - 9 - 10) = (11)	-4.4	-101.4	-39.8
Profit Tax (12)	0.3	0.0	0.0
NET INCOME OR LOSS (11 - 12) = (13)	-4.7	-101.4	-39.8

Sources: FSR, Fiscal and Financial Issues Report, 1998 and OGM, 1999

* Budgeted figures at the beginning of 1999.

Note that sums are not exact, a cumulative result of rounding approximations.

Note that budget deficit levels were \$37.8 million in 1998 and \$99 million in 1999. As a result of the transfer of firefighting costs from OGM's "revolving" budget to its "added" budget, increase in transfer payments to the Treasury and increases in the sale prices of wood, it is anticipated the budget deficit will be closed in 2000.

70. OGM's practice is to produce and sell essentially standard volumes of timber every year. It seeks a balance between income and budgeted expenditures in significant part by application of a "cost price," calculated without reference to market values. This is then used as a reserve price at public timber auctions. About 80 percent of the cost price is attributed to overheads, administrative expenses and recurrent costs and investments that have no direct relationship to production. Nor are they calculated for a District Enterprise where the production actually takes place. Instead, they are calculated to cover Headquarters and all District Enterprises. The uniformity of management approach across OGM operations masks a high level of cross-subsidization – it appears that economically inefficient districts are subsidized by the profits of relatively few productive districts, and that of 245 District Forest Enterprises fewer than half consistently generate an operating surplus. This is only partly attributable to differences in efficiency, however. Some districts have a rich forest resource and substantial revenues from timber sales; for others with a poorer resource base, expenditures in management and regeneration are higher.

71. Since the opening of the market in 1993, OGM's calculated reserve price has been significantly higher than the market price, leaving OGM with severe difficulties in selling its products under the more competitive market conditions. In some cases, OGM sells wood at a price that does not cover the costs which are attributed to production in the current system. Understanding where wood is truly being sold at a loss, versus losses incurred through transfers to other agencies, will require further study¹⁷; however, there would appear to be significant opportunities for increasing revenues by selling forest products at competitive market prices.

Table 5. OGM's Budget Categories as Percentages of OGM's Total Expenditure

Expenditure category	1992	1993	1994	1995	1996	Average
	% of total annual expenditures					
1. Production expenditures ¹	24.77	24.53	22.6	27.18	30.18	25.86
2. Wood stocking expenditures	4.04	2.80	4.87	3.20	4.62	3.91
3. Wood sale expenditures	0.24	0.98	0.45	0.34	0.73	0.55
4. Cadastral surveys	0.26	0.29	0.22	0.09	0.15	0.20
5. Forest maintenance expenditures	24.05	27.06	20.22	19.44	16.88	21.53
a. Silvicultural implementations ²	9.42	10.54	7.74	6.46	5.62	7.96
b. Forest protection ³	9.20	10.23	8.02	8.96	7.32	8.75
c. Forest mapping and planning	0.17	0.18	0.22	0.22	0.23	0.20
d. Road construction and maintenance	5.26	6.11	4.24	3.80	3.21	4.62
6. Repair shops (for forest machinery)	0.73	1.21	1.28	1.05	0.96	1.05
7. General administrative expenditures	32.18	28.81	28.27	23.80	29.76	28.56
a. Salaries	27.50	23.98	23.64	19.61	23.66	23.68
b. Other recurrent expenditures ⁴	4.68	4.83	4.63	4.19	6.10	4.88
8. Depreciation (i.e. buildings, vehicles)	0.30	0.27	0.14	0.32	0.67	0.34
9. Auxiliary services	2.78	4.49	2.45	2.02	1.28	2.60
10. Transfers ⁵	10.15	9.43	18.54	22.10	14.70	14.98
11. Other expenditures	0.50	0.13	0.94	0.46	0.07	0.42
T O T A L	100.00	100.00	100.00	100.00	100.0	100.00
					0	

Source : GDF, 1998

Prepared by M. DOGRU

¹ Felling, extraction, transportation

² Tending, thinning, regeneration etc.

³ Against fire, insects and diseases etc.

⁴ Office expenditures, mail electricity etc.

⁵ Treasury share, corporation tax, payments to various forestry funds (reafforestation fund, forest villagers development fund) and non-forestry funds.

72. A further revenue issue is that more than half of OGM's production is sold through administered sales at allocated prices applicable to specific buyers. In 1998, about 3 million m³ of industrial roundwood (60 percent of total roundwood production) was sold through administered sales. In addition, OGM is legally obliged to provide logs and fuel wood to forest villages and their

¹⁷ Proposals are under consideration to reallocate costs for certain classes of forestry operations (i.e., services of a non-commercial, public nature) from the "Revolving" budget, which records OGM's quasi-commercial costs, to the "Added" budget, which records its non-commercial costs. Such reallocation may be justifiable in view of the mix of commercial and public purposes served by such works, although budget adjustment will not address the sector's financing gap.

cooperatives at subsidized prices: 33 percent of cost price, or at the rate of the resource tax (see below). The volumes of subsidized roundwood and fuel wood sales to forest villagers were 0.5 million m³ and 4 million m³ respectively, in 1998, corresponding to 6 percent of total roundwood and 60 percent of total fuel wood, 30 percent of OGM's total wood sales. In the past, the administered sales were a significant financial burden for OGM. At present, as a result of the drop in market prices, the difference between the market price and the set price is diminishing. The subsidized sales to forest villagers and cooperatives still impose a cost on OGM, however, and the program as a whole limits OGM's options.

73. While revenue is decreasing, OGM's costs remain high. OGM has begun to identify ways to reduce costs, though these efforts have not yet had much impact. Under current circumstances, there seems little prospect for realizing significant reductions in wage and labor costs, which account for the largest share of OGM's operating costs. Cost-reducing measures such as replacing contracted timber harvests with sales of standing wood have merit, but are controversial, do not seem to have been adequately analyzed and are resisted by politically influential stakeholders – especially forest village cooperatives, which coordinate harvesting works of forest villagers. Proposals are now under consideration to reallocate costs for specific classes of forestry operations (i.e. non-commercial services) from the “revolving” budget, which reflects OGM's quasi-commercial aspect, to its “added” budget, which records expenditures of a public nature. Such a reallocation may be justifiable, but this kind of budget adjustment does not address the underlying sectoral deficit. MOF has also been studying the possibility of closing some of the forest district directorates that have continuously imposed losses on OGM. There is a need to re-assess operations on a large number of OGM District Forest Enterprises. Management of the forest resource on many of these areas may be more appropriately shifted to a less timber-intensive style of operation, at lower cost and with potentially significant environmental and social benefits.

74. The declining profitability of OGM is felt broadly across the sector. From its profits, OGM finances forest management, reforestation works and research through its own agencies, and supports forest villages through various employment initiatives and other OGM efforts noted above. Various important field programs are no longer adequately financed. Moreover, OGM contributes to the AGM Fund, which finances afforestation, and to ORKÖY, which supports economic development in forest communities. These contributions are also declining. Thus, OGM's performance affects the entire sector through its impact on the linked budgets of other Ministry of Forestry agencies. As a result of these issues, there appears a risk that the sector will ignore pressing long term investment needs, including forest conservation, silvicultural works, reforestation and reclamation of degraded land.

75. **Resource Tax.** Forest resource taxation (stumpage) is a complex issue and appropriate levels and assessment methods depend on ownership structures and responsibilities for reforestation as well as on economic valuation methods. Appropriate levels depend on the services required by society from the manager of the forests, and can be negative in forests where the resource base is depleted. The resource tax in Turkey, determined each year by the State, is the amount paid by OGM for each cubic meter of wood and each unit of non-wood products sold by OGM. This tax operates as a transfer from one budget of OGM – the revolving capital budget, the immediate recipient of revenue from wood sales – to another, the added budget, where it is one of several contributions that finance non-commercial services of OGM, such as reforestation and management planning. However, in current practice, the resource tax is a component of the price set by the Government to state buyers, and so the administered price would rise if prices continue to be determined by this formula. Likewise, the

resource tax is part of the formula that sets the price of wood sales to villagers, and so those prices would rise if the tax rose. The argument has been made that the resource tax, which partly funds non-commercial forestry functions, is too low.

76. The resource tax is not the only link between wood sales on one hand and sustainable management on the other. Several other means exist to transfer OGM's sales revenues to afforestation, reforestation, and other sustainable-management functions, including OGM's treasury share payment and OGM's transfers to AGM and ORKÖY. Therefore the level of the tax is not strongly linked to the level of resources available for forest management. Nor is it certain to what extent raising the tax would increase the revenue from it, since an increase would tend to raise the price of Turkish wood above its already non-competitive level.

77. OGM's planning should take into account the economic value of natural resources in a transparent way. Further study is required as assessing what level of resource tax would be realistic and would ensure optimal profitability and sustainability of the forest management.

78. **AGM.** AGM is financed by the AGM Fund, which according to legislation has numerous sources of income, including the state budget, OGM, wood buyers/importers, the Ministry of Environment, beneficiaries of subsidized forest products, and donors. However, in practice, the AGM revenue supply is weak. Because there are no sanctions in the legislation that would enforce payments, some designated contributors fail to make payments. In 1997 and 1998, for example, the main contributors were OGM and MOE. Due to the financial crisis faced by OGM during recent years, there have been shortfalls in the transfer funds from OGM's, which has compromised AGM's financial status. These funding shortages constrain AGM's ability to carry out its responsibilities, which include reforestation of Turkey's several millions of hectares of degraded land. AGM's other assigned tasks (erosion control, range improvement) are also beyond the capacity of the current budget. Analysis carried out under this review (see Annex 2) compared the cost of afforestation of several million hectares of existing degraded forest land with minimum estimates of the benefits of afforestation. The analysis showed that this investment would be economically beneficial and, in the long term, could roughly double the value added to the Turkish economy from forest resources. Benefits would be sustainable,¹⁸ and would provide vital environmental services and significantly contribute to the development and welfare of rural communities.

79. **MPG.** The state budget contribution to MPG is inadequate to support effective management of protected areas. At the same time, a significant portion of revenue from the National Parks Fund (from entrance fees for national parks, nature parks and protected areas) is transferred to the Treasury but not made available for management of national parks and protected areas programs. Despite some recent increases, hunting permit revenues, which are used for conservation and development of wildlife and hunting resources, are far below their potential.

¹⁸ Analysis presented in Annex 2 suggests that reforestation/rehabilitation of Turkey's vast areas of degraded forest lands and utilization of their idle capacity would raise the minimum value of domestic consumers' surplus by US\$1.2 billion per year. Global benefits of such investment, particularly by increasing carbon stock and environmental values, could be even higher than domestic benefits, while global losses from failing to reforest and rehabilitate of these areas would be significant. The recommendation of the analysis is that: the both domestic and international policymakers have an economic incentive to increase the area of Turkey's forests towards their true optimum without waiting, skeptically, for international markets in carbon storage and pharmaceutical gene-banks to emerge.

80. **ORKÖY.** ORKÖY's activities are financed by the ORKÖY Fund. By law, 0.1 percent of the national budget should be allocated to the ORKÖY Fund in order to finance ORKÖY's activities. Moreover, OGM is required to contribute 3 percent of revenue from wood sales, plus 10 percent of its annual profit, to the ORKÖY Fund. These are the principal sources of funding, while additional, minor sources include revenue from the sale of forestland. However, the allocation from the national budget has never materialized, and in OGM's current financial difficulties, its contribution to the Fund has fallen to 3 percent of wood sales. Net allocations for poverty reduction programs in forest-dependent villages are far from adequate. While the flow of resources to ORKÖY has been constrained, its performance with resources it does receive has also been weak. The ratio of ORKÖY operating cost to funds disbursed is almost 1:2. For example, in 1998, ORKÖY intended to disburse US\$ 5.8 million as credit to forest village cooperatives and individuals, and to spend US\$ 3.3 million as recurrent expenditure. Experience with micro-credit schemes in other countries shows that this proportion of overhead cost is not excessive, suggesting that the targeting and performance of ORKÖY operations should be subject to review and reform.

81. **Conclusion.** The financial problems of the sector arise from several sources. One set of issues relates to the operational performance of OGM and the extent to which OGM has not been able to adjust to an increasingly competitive marketplace. The second arises from the mixture of "private" and "public" good functions performed by the forest organizations. Development of a consolidated sectoral budget would provide incentives for efficient and sustainable forestry operations, promote better targeting of poverty alleviation and more secure financing for environmental management, provide needed information to support strengthened involvement of local people and other key stakeholders, and more generally increase transparency in sector operations.

82. With respect to financial sustainability, the challenge is to overcome current incentives that place politically difficult reforms associated with agency staffing at a higher priority than other sector objectives, including environmentally sustainable management and alleviating the poverty of forest villagers.

V. TOWARDS A DEVELOPMENT AGENDA

83. A common theme running through the challenges facing the forestry sector is the need for greater selectivity and priority setting. Turkish forest resources have consistently been seen as a means to advance a wide range of valid and desirable objectives and, in the last decade, additional demands have been layered on the sector as awareness of environmental values and public demand for multipurpose use of forests have increased. The first priority for Turkish forest development must be creating a stronger capacity to make strategic choices and set priorities in a way that will maintain and enhance all forest products and services.

A Vision for Turkish Forestry

84. A long-term vision of the role of the forestry sector can help to formulate the agenda for sectoral change. The principal goals of forest development in Turkey have been largely consistent over the last twenty years. They have included sustainable production of forest products and services, poverty reduction, employment generation and environmental conservation. Realization of these goals in the context of strengthened economic discipline would be likely to lead to the following:

- Multipurpose planning and management of forest resources to provide multiple benefits (environmental, social, economic and cultural) at local and national levels, and on a sustainable basis.
- A decrease in the forest areas that are managed principally for wood production, while efficient wood production in those areas would be improved. The forest area managed with a main objective other than timber production would increase.
- The area set aside for national parks and protected areas will be expanded and will adequately cover a representative range of Turkey's natural ecosystems. Effective management planning and operations will be introduced to the parks and protected areas system. Approaches already piloted to involve local people in management would be extended, providing effective protection and increased benefits to local communities.
- The levels of reforestation and rehabilitation undertaken annually on degraded forest lands will rise significantly, with the active involvement and contribution of local communities and other stakeholders. A significant proportion of these areas will be managed jointly with rural communities to meet local demands for firewood, grazing, erosion control and non-timber forest products, employing forest management practices that conform to the principles of sustainable forest management.
- Fewer people will be dependent on the forests and the responsibility for the welfare and development of poor communities in forest areas will shift from the Ministry of Forestry to other agencies and local administrations.
- Growing public awareness and sensitivity will lead to a policy, legal and institutional framework for sustainable management of forest resources in the overall interest of Turkish society.

- Efficient conservation and sustainable management of Turkey's forest resources will make an important contribution to global values at regional and global levels, in accordance with Turkey's commitments under the relevant global conventions and international processes (e.g., United Nations Conference on Environment and Development (UNCED), Intergovernmental Forum on Forests/United Nations Forum on Forests (IFF/UNFF), and the Pan-European and Near East Processes).

85. **Potential of Reform.** Reforms that make resource users more aware of and able to act upon the real value of forest resources, such as introduction of participatory/multipurpose planning and improved access to unstocked (degraded) forest areas for private sector and community based reforestation, could help set the stage for investments in land management on several million hectares of degraded forest lands. Issues and Recommendations are summarized in matrix form in Annex 1.

86. **Action Priorities.** The recommendations presented below could be incorporated into a program for natural resource development in Turkey that could be supported by the World Bank or other agencies in the medium and long term. These actions would address the sectoral challenges outlined in this review, including: poverty in forest communities, uncertain tenure and ownership boundaries, the need to realign forest management planning along multi-purpose and participatory lines, soil erosion and control of land degradation, and sectoral deficits. These actions may help lay the groundwork for realizing the sector's opportunities as well through incorporating new techniques to intensify timber production in selected areas, managing other areas primarily for non-timber forest values, and afforesting degraded lands.

87. *Poverty Alleviation.* Initiatives should be undertaken to strengthen support for poverty alleviation in forest villages that are presently dependent on excessive/destructive use of forest resources and that are not receiving adequate attention and support from present rural development programs. Farmers, including farmers in forest communities, will be eligible for direct income support under the Agriculture Reform Implementation Project (ARIP) and such payments are expected to become available in calendar year 2001. Over the course of its implementation the ARIP program is expected to phase in more targeted support for poor communities that would include forest villages. However, alleviation of poverty in forest communities will require augmenting such targeted income support with a more integrated (multi-sectoral) approach to rural development that is not based solely on forest resource management, as well as the introduction of community-based natural resource management systems.

88. *Completing Cadastral Survey and Border Delineation Works for Forest Lands with Priority Focus on Areas where Tenure Disputes Occur.* Cadastral surveys, forest border delineation and land ownership registration works have not been completed for significant forest areas as yet. The tenure disputes caused by this situation create serious constraints on adequate implementations of major forestry programs, such as reforestation and soil conservation, and also on forest villagers in use of their own agricultural and pasture lands. Moreover, frequent changes in the forest definition, followed by removal of forest areas from forest regime, result in yet further changes in forest borders, creating additional tenure disputes. A program to complete forest cadastral surveys, register legal borders of forest lands and settle tenure arrangements should be implemented. Steps should be taken to establish a sustainable legal framework to safeguard the public interest by preventing changes in the borders and areas of forest lands for opportunistic individual gain.

89. *Institutionalization and Expansion of Demonstrated Approaches to Community-Based Multipurpose Resource Management.* Promising approaches to community involvement in natural resource management have been demonstrated in Turkey. In forestry and range and pasture management, however, these have been introduced on quite a limited scale. On the basis of successful experiences (such as the Eastern Anatolia Watershed Rehabilitation Project) the Government should move to mainstream participatory planning and management into the ongoing public investment program and into local administration. There is an urgent need to improve multipurpose management of forest resources and to invest in reforestation/reclamation of existing degraded forest areas, perhaps best addressed through community-based efforts. While restructuring the organization and finances of the forestry sector, the Government could formulate a long-term national reforestation/reclamation program, providing land allocation, utilization rights, financial, technical and extension services, and research support to community-based efforts. Designing and implementing such a program would require determination of the condition and potential of forest resources (soil, water, flora, fauna, biodiversity) as well as estimates of future demand for forest products and functions at the local and national levels. Draft Terms of Reference for a pilot study of this kind are provided in Annex 3 of this report.

90. *Piloting and Testing of Improved Approaches to Biodiversity Conservation.* Turkey's rich endowment of biodiversity stands in contrast to the meager resources made available for its management and protection. While the area of national parks, wildlife reserves and other protected areas has grown rapidly in recent years, only a few areas have effective management. Protected areas are at risk from a variety of threats including the livelihood efforts of local communities and uncontrolled development for residential, tourism and other purposes. Turkish forests, both inside protected areas and in production forests, have important global values, and there may be justification for international support of biodiversity and other forest values in Turkey. In order to capture those benefits, it will be necessary to develop new models, experience and capability in protected-areas management. The recently completed GEF-supported In-Situ Genetic Resources Conservation Project and ongoing Biodiversity and Natural Resource Management Project provide useful models and should be carefully monitored and evaluated.

91. *Development of Operational Restructuring Options.* The current structure of the forestry sector in Turkey needs to be reconsidered; in particular, the organizational structure of public sector agencies, the allocation of responsibilities among the public, private and local community sectors, and the financial and budgetary provisions which tie them together. A restructuring analysis would start from the most basic forest unit, identifying the most socially desirable use of its resources and the obstacles, financial, policy, institutional or other, that prevent realization of that use. The analysis would propose management and financing arrangements, identify the legal and regulatory measures needed to introduce the desired changes, project the consequences of such a restructuring (including impacts on wood production, production of other forest goods and services and income distribution and employment) and estimate its budgetary impact (its financing requirement and any gain/loss of Government revenue). An evaluation of this kind should cover all forest management units eventually, but it would be possible to have an initial focus on areas of particular significance, consistently strong or weak financial performance or affected by pressing social issues

92. **Next Steps and the Potential Role of the World Bank.** This Sector Review has provided a broad overview of the challenges facing Turkish forestry and general suggestions on policies and institutional arrangements that could be pursued. An important next step would be a formal process in

which a broad range of stakeholders were engaged in discussion of the perspective offered in this report and could present alternative views of sectoral priorities.

93. Because the World Bank is already active in financing projects in forestry and related sectors, and is engaged in discussions on a range of agricultural policies, there is the prospect of further Bank support addressing the policy issues raised in this review. In line with the Bank's historical support to forestry in Turkey, its current involvement in the Eastern Anatolia Watershed Rehabilitation and Biodiversity Conservation Projects, and its ongoing dialog with Government on agricultural policies, further Bank involvement in Turkish forestry could take several forms. Key Bank priorities would be in expansion of environmental conservation and poverty-reducing use of forest resources, especially where the local communities and other stakeholders participated in improved multipurpose management of the forest resources and in reforestation, reclamation, and improved management and utilization of degraded forest lands. Expansion of these efforts would need to take into account the distorting effect of policies and financial systems that partly link the availability of resources for poverty alleviation, reforestation and other reclamation activities to OGM's performance. A preferred alternative would be the collaborative design of a sectoral restructuring program that would establish more flexible and efficient commercial forest operations, better-targeted poverty alleviation and improved environmental management, with strengthened involvement of local people and other key stakeholders.

ANNEX 1: POLICY RECOMMENDATIONS

A policy framework that has proven helpful focuses attention on **Resource Mobilization, Incentives, and Governance**. This Annex applies that framework to develop a matrix of policy recommendations.

Efficient resource mobilization for development. Policies on use of resources should ensure that resources are put to work in ways that are sustainable and efficient. To be successful, the full value of the natural resource asset should be recognized and procedures in place to compare the value of alternative allocations. Linked to these fiscal concerns is ensuring that specific resources are mobilized by being assigned through tenure, legal, and operational arrangements to environmentally suited and socially accepted uses. Policy analysis should question whether adequate measures have been taken to ensure the appropriate legal or tenurial status of areas in need of protection or other special management. Making sure that the right land is used for the right purposes is a central resource mobilization concern.

Incentives. The incentive framework – the whole complex of prices, rules, regulations and other forces that influence decisions and information they provide – is crucial for natural resource management. Resource users and managers can be acutely aware of limits to resource availability provided they are not misled by distorted institutions or bad policies.

Governance and control over resources. Establishing a framework of governance – systems of control, conflict resolution and distribution of benefits – is an essential part of natural resource development. There are specific economic relationships that complicate public land management. Land ownership patterns have often evolved so that areas generating easily captured economic returns are privatized, leaving residual resources in the public domain. Even though public lands may hold very valuable resources, productivity may be low or costs of monitoring and protecting vast areas may be high. These may imply a financing gap for many public land management agencies and leave management subject to highly politicized budgets. Similarly, many important environmental services of public lands, such as hydrologic processes and amenities, have a public good character which can further reduce the financial viability of the land management agency.

Table 1-1. Turkey Forest Policy Matrix

Issues and Strategic Considerations	Current Status	Suggested Elements of a Revised Policy Framework	Recommendation
Resource Mobilization	<p>Policy should seek to assure that natural resources are allocated to appropriate and sustainable uses, that rents generated from exploitation of publicly owned natural resource are channeled through appropriate budgetary procedures to high priority uses, and that public expenditure procedures provide adequate resources for natural resource investments, maintenance and protection.</p>	<p>Budgets of forestry agencies are currently interlinked. Elements of AGM, MPG and ORKÖY budgets are set by formulas given in law but are consistently ignored and are infeasible.</p>	<p>Budgets for environmental aspects of forestry and for social protection and development of forest villages, should be isolated from financial performance of production forestry agency. Spending plans should be established on the basis of specific targets for social and environmental programs and should not be reserved for forestry agencies (especially for social aspects).</p>
Budgetary Process	<p>Sales of wood at subsidized prices to some buyers, large transfers to other agencies, and financing of various activities of a public service nature from OGM's revolving fund budget weaken the link between OGM's efficiency and its apparent financial performance as a quasi-commercial entity.</p>	<p>Budgets for environmental aspects of forestry and for social protection and development of forest villages, should be isolated from financial performance of production forestry agency. Spending plans should be established on the basis of specific targets for social and environmental programs and should not be reserved for forestry agencies (especially for social aspects).</p>	<ul style="list-style-type: none"> • Undertake detailed review of budgetary mechanisms for OGM, AGM and ORKÖY leading to drafting of revision of legislative budgetary provisions. • Review expenditure, employment and in-kind subsidies to forest villages and estimate equivalent.
Incentive Framework	<p>Policy should aim to ensure that all resource users recognize and respond to natural resource scarcity through realistic prices, regulations and other incentives.</p>	<p>Cadastral surveys, forest border delineation and land ownership registration works have not been completed for significant forest areas as yet. The tenure disputes caused by this situation create serious constraints on adequate implementations of major forestry programs, such as reforestation and soil conservation, and also on forest villagers in use of their own agricultural and pasture lands.</p>	<p>The necessary initiatives should be undertaken to establish a sustainable legal framework preventing inappropriate changes in the borders and areas of forests.</p> <ul style="list-style-type: none"> • A program should be undertaken to complete forest cadastral surveys, register legal borders of forest lands and settle tenure arrangements.
Land Tenure	<p>Cadastral surveys, forest border delineation and land ownership registration works have not been completed for significant forest areas as yet. The tenure disputes caused by this situation create serious constraints on adequate implementations of major forestry programs, such as reforestation and soil conservation, and also on forest villagers in use of their own agricultural and pasture lands.</p>	<p>The necessary initiatives should be undertaken to establish a sustainable legal framework preventing inappropriate changes in the borders and areas of forests.</p>	<ul style="list-style-type: none"> • A program should be undertaken to complete forest cadastral surveys, register legal borders of forest lands and settle tenure arrangements.

Issues and Strategic Considerations	Current Status	Suggested Elements of a Revised Policy Framework	Recommendation
Forest Planning Process	Forest planning processes, guidelines and traditional practices promote an excessive orientation toward timber production and lead to under-management of other forest goods and services.	Policy should promote maximization of the overall social contribution of forestry, including social, environmental and timber values. Participation of a broad range of key stakeholders in the planning process, particularly local communities, should be secured.	<ul style="list-style-type: none"> • Pilot and test improved approaches to biodiversity conservation. Develop new models, experience and capability in protected-areas management. • Reconsider the organizational structure of public sector agencies, the allocation of responsibilities among the public, private and local community sectors, and the financial and budgetary provisions which tie them together. (1) Pursue pilot participatory multipurpose forest management planning exercises. (2) Based on experience in pilot, restructure field management units around assessment of primary management objectives, and revise management planning guidelines and standards to emphasize multiple use orientation and input from local people.

Issues and Strategic Considerations

Poverty Alleviation

Current Status

Some forest villages are presently dependent on excessive/destructive use of forest resources and are not receiving adequate attention and support from present rural development programs.

Suggested Elements of a Revised Policy Framework Recommendation

The lack of incentives for sustainable use of natural resources by poor forest villagers must be addressed, in a manner sensitive to equity considerations.

- Initiatives should be undertaken to strengthen support for poverty alleviation in forest villages. Integrated (multi-sectoral) rural development approaches should be considered, as well as the contributions of relevant agencies and the measures necessary to target a program to the poorest forest-dependent people
- A study of the resource tax should be undertaken. Resource tax reform could be introduced together with restructuring of the timber sales mechanism, to ensure that OGM undertakes only the level of resource exploitation indicated by the private sector's willingness to pay.

Resource (Stumpage) Reform

The resource tax paid by OGM for wood harvested from public land may not be the right financial instrument for efficient sustainable forest management.

The forest resource tax regime should be adapted to the social, environmental and commercial role of forests as well as the management services performed by the user.

Sector Governance Organization
Local Control

and Policy should be based on a broad consensus among a range of stakeholders on the legitimacy of control over resource use and access.

Control over forest resources is highly centralized, with planning and decision-making focused at OGM. Local preferences are asserted through highly politicized, but informal, processes that favor established elites to the disadvantage of priority poverty groups.

Although forest land is owned by the State, local communities should be provided more opportunities for input through transparent and regularized processes that reinforce the accountability of public officials for results.

- Approaches to community based resource management which have proven successful in Turkey in the East Anatolia Watershed Project and in the irrigation subsector should be mainstreamed through development of supportive regulations, guidelines and budgetary processes.

Issues and Strategic Considerations	Current Status	Suggested Elements of a Revised Policy Framework	Recommendation
Village Development	<p>Primary responsibility for forest village development resides with ORKÖY whose field program is under funded and ineffective. OGM provides in-kind subsidies through preferential procurement practices that are untargeted and unsustainable. Other government agencies, local institutions, and forest village communities (mostly located in remote areas with limited agricultural resources) are weak. Multi-sectoral and integrated rural development efforts and programs do not exist.</p>	<p>Primary responsibility for forest village development and social safety nets should be the responsibility of local government and main line social welfare agencies. ORKÖY should focus on strategic aspects of forest village development, assembly of data and information on the incidence, nature and distribution of forest-based poverty and on the design and promotion of programs and projects to be implemented by NGOs and specialized rural development agencies. Multi-sectoral and participatory rural development approaches and programs should be implemented.</p>	<ul style="list-style-type: none"> • A Living Standards Measurement-type study should be commissioned focusing on forest village areas for use by ORKÖY in developing a coherent strategy for forest-based poverty reduction. • Appropriate multi-sectoral and participatory rural development models should be tested and developed through a pilot project in representative forest regions.

ANNEX 2: ECONOMIC MODEL OF THE FOREST SECTOR

How Much Forests Could be Expanded by Reforestation and Reclamation of Degraded Forest Lands – Policy Recommendations from an Economic Model of Supply and Demand for Turkish Forest Land¹⁹

SUMMARY

This Annex describes a model of Turkey's forest sector that was developed with the support of the World Bank's Global Overlay Program. The modeling exercise was intended to estimate the area of forest that Turkey would have if (a) domestic policies were reformed to reflect the full economic value of forests to Turkish society, and (b) the full value of Turkish forests to the global community were reflected in resource allocation. The model is highly simplified, and not suitable for investment planning. However, it provides a sense of the magnitude by which different policy reforms could influence land use.

The analysis suggests that the benefits of forestry operations would exceed the costs of those operations on 15 million ha of land, or perhaps even more, if the full domestic value of Turkish forests were taken into consideration. If the analysis holds, then Turkey's optimal forest area is roughly twice the current area. The analysis also shows that taking account of international benefits as well adds only a few percent to the estimate of optimal forest area. This means that it is far more important for the international community to provide assistance in correcting domestic market failures than to correct international market failures. Turkey is a case in which domestic and international interests largely coincide. Greatly increasing Turkey's forest area is a win-win proposition both for Turkey and for the international community.

Correcting domestic market failures would involve policy reforms including removing disincentives to reforestation investments, regularizing the black market in fuel wood, improved forestry practices, and measures to ease the pressure on degraded forestland. Correction of international market failures, on the other hand, would involve a very large annual transfer to Turkey (in full payment for the carbon sequestration and gene-bank services of its forests). Correcting informational imbalances within a national-level policymaking forum can be far easier than doing so on an international scale. Other types of market failure not necessarily stemming from informational problems can also be much more easily addressed at the national level than the international.

This does not suggest that international transfers are unnecessary or unadvisable, nor that the international community has no responsibilities with regard to the reform of the Turkish forest system. It does indicate that there is little support for the notion of long term, recurring transfers to "capture" for Turkey the annual international services of its forest. There is, however, a strong case for assistance through *one-time* transfers. Since it is domestically optimal for Turkey to engage in large-scale reforestation that would raise its forest area to at least 15 million hectares, the

¹⁹ Prepared by Michael A. Clemens for the World Bank Turkey Forest Sector Review Global Environmental Overlays Program

international community could find it optimal to help if there were a temporary impediment to such reforestation (such as the unavailability of capital to finance these works). Specifically, the international community would optimally be willing to make a one-time payment of up to the Net Present Value of the discounted stream of international benefits flowing from the reforested land: US\$3.5 billion at a 10 percent discount rate. But even if this financing were at full market rates of interest, Turkey would find it optimal to borrow for reforestation, and the international community would optimally offer loans—at market rates or below.

Two encouraging messages emerge. First, the policy challenge of ensuring the long-term, recurring supply of global benefits from Turkey's forests may be more a national than an international one—and may thus be much easier to overcome. Second, it would be both domestically and internationally optimal for the international community to offer assistance with the national policy reforms necessary to unlock the long-term potential of Turkey's forests.

INTRODUCTION

The current extent and condition of Turkish forest land have been heavily influenced by myriad human interventions, motivated in turn by a range of markets in forest-related commodities. If the socially efficient price of every forest-related commodity could be known, it would be possible to determine Turkey's optimal forest extent. This, of course, is not feasible, since every market in every commodity related to the forest is flawed and many of these markets are entirely missing. However, often it is not necessary to achieve accurate commodity prices to recommend one policy alternative over another. To demonstrate the optimality of maintaining a parcel of land under forest, it is sufficient to show that the net benefits of doing so exceed the net benefits of the second-most profitable competing use for that land. It is superfluous to even attempt calculation of *all* forest benefits if even those which are easily calculable outweigh those of the competing use.

National and international policymakers whose decisions affect Turkish forests face difficult tradeoffs and scarce resources, and can be assisted in their efforts by this type of analysis. The present study attempts restricts its scope to commodities directly linked to Turkish forests: roundwood, fuel wood, several non-wood forest products such as chestnuts, fodder, forest recreation and tourism, watershed protection services, carbon storage services, and pharmaceutical gene bank services. The present study attempts, through extremely conservative assumptions at every step, to establish *bounds* on these prices. If it can be shown that the benefits of maintaining a certain parcel of land under forest clearly exceed x , and the opportunity cost of doing so is clearly less than y , then if $x > y$ then it is optimal for that parcel to be under forest even if the benefits and costs of doing so are uncertain. Ideally this analysis would be done for each and every hectare of land in Turkey, but the available data are more aggregated. The existing high forest and degraded forest of Turkey are divided into ten large parcels of land according to Site Class and forest condition, and bounds on benefits and costs are estimated for each such parcel. The result is an estimate of the lower bound on the optimal Turkish area of forest. A sensitivity analysis can then explore the effect on the lower bound of domestic policies such as reforestation investments, and of international policies such as cash transfers. It is important to emphasize the nature of this optimal area as a *lower bound*.

METHOD

Estimating a lower bound on forest benefits for each new parcel brought into forestry, the “Demand Curve”

For each site class, lower bounds on potential domestic (D_d) and global (D_g) willingness-to-pay for forest benefits were calculated according to:

$$i_c = (1 - f) r_c h i$$

$$i_b = (1 - f) r_b h i$$

$$i_f = f r_f h i$$

$$D_d = p_c i_c + p_b i_b + p_f i_f + n_d$$

$$D_g = D_d + n_{row}$$

where:

i_c = per-hectare useable increment of coniferous wood. “Useable” increment is total Mean Annual Increment less wood which is not of sufficient quality to extract and less harvesting losses.

i_b = per-hectare useable increment of broadleaf wood.

i_f = per-hectare useable increment of fuel wood.

f = percentage of forest area within site class that is primarily coppice forest. See Appendix Table 2-1.

h = percentage of total Mean Annual Increment that is not either 1) of insufficient quality to harvest, or 2) lost during the harvesting process. The value used, 70 percent represents current GDF best practice and is thus a lower bound on the true value (assuming there will be some future decrease in harvesting losses). [Source: Special Expertise Commission Report on Forestry, as cited in Muzaffer Dogru, *Turkey Forest Sector Review Synthesis Report*, Section 5.6.1, 1998.]

i = Mean Annual Increment per hectare for relevant site class ($m^3/ha/yr$). See Appendix Tables 2-2 and 2-3.

r_c = Ratio of increment in coniferous wood volume to increment in total wood volume. The values used are 1.11 in productive forest, 1.12 in degraded forest. Calculated from Appendix Table 2-1.

r_b = Ratio of increment in broadleaf wood volume to increment in total wood volume. The values used are 1.68 in productive forest, 2.00 in degraded forest. Calculated from Appendix Table 2-1.

r_f = Ratio of increment in fuel wood volume to increment in total wood volume. The values used are 0.78 in productive forest, 0.92 in degraded forest. Calculated from Appendix Table 2-1.

p_c = Estimated market value of one cubic meter of coniferous roundwood, averaged across all wood product type prices, weighted by relative wood product production volumes. Value US\$86. See Appendix Table 2-4, whose values must be adjusted to include 22 percent taxes and levies paid. Since the Turkish Ministry of Forests projects that domestic roundwood demand will grow far faster than domestic supply on the period 1999-2009 [Source: World Bank, Turkey FSR Global Environmental Overlay *Initiating Memorandum*], it is likely that the 1997 wood price figure used herein will represent a lower bound on future wood prices (at least in Turkish Lira terms, though not necessarily in dollar terms). Note it is assumed that the relative production volumes of

different wood products will remain the same, an approximation clearly justified for all non-fuel-wood products by the historical evidence presented in Appendix Table 2-5.

p_b = Estimated market value of one cubic meter of broadleaf wood, averaged across all wood product type prices, weighted by relative wood product production volumes. The value used is US\$97. See Appendix Table 2-4.

p_f = Estimated market value of one cubic meter of fuel wood. The value used is US\$25. See Appendix Table 2-4. The assumption that future fuel wood prices will be similar to those in 1997 may not seem appropriate to the calculation of a lower-bound on value, since relative production of fuel wood has been decreasing (see Appendix Table 2-5) and absolute demand for fuel wood is expected to decline moderately over the next 20 years [Source: World Bank, Turkey FSR Global Environmental Overlay *Initiating Memorandum*]. There are reasons to doubt that these forces would cause a significant decline in fuel wood prices, however. First of all, it is estimated that perhaps the majority of current fuel wood demand is satisfied illicitly [Source: World Bank, Turkey FSR Global Environmental Overlay *Initiating Memorandum*], meaning that the current fuel wood auction price is artificially depressed. As regularization of the fuel wood market continues, the effects of this artificial depression may lessen. Second, the small profit margin on fuel wood production does not leave much room for significant price cuts to below \$20/m³, and in fact fuel wood market prices in a wide variety of developing countries tend to fall on the \$20-\$25/m³ range [Source: Barnes, Douglas F. 1992. *Understanding Fuel wood Prices in Developing Nations*. Industry and Energy Dept., Energy Series Paper No. 56. World Bank.]. In other words the supply curve for fuel wood tends to be flat, and a fall in demand is not likely to have a large effect on price.

n_d = Lower bound on average domestic non-wood benefits of one hectare of forest land. The value used is US\$37/year. This figure includes non-wood forest products, hunting/fishing, fodder, tourism, recreation, and watershed protection.

n_{row} = Lower bound on average non-wood benefits of one hectare of forest land accruing to the Rest of the World (not including Turkey). First, this includes a value of US\$5/ha/year representing a lower bound on the global value of one hectare of the forest as a gene bank for future scientific exploitation. [Source: Camille Bann, *Turkey Forest Sector Review, Global Environmental Overlay Program Final Report*, 1998.] Second, this includes a carbon storage value, which was estimated at US\$10/ton of carbon. To estimate tons of carbon stored per hectare in each Site Class, figures on total standing growing stock by species (Appendix Table 2-9) were combined with figures on the area of each Site Class dominated by a particular species (Appendix Table 2-10) to estimate the standing growing stock per hectare in each Site Class. These figures were then augmented by a factor of 1.987 (for coniferous wood) or 2.118 (for broadleaf) to account for foliage, bark, roots and root bark, and the resulting volume converted to tons of carbon by 0.215 tons C per cubic meter (for coniferous) or 0.254 (for broadleaf). See Appendix Tables 2-11 and 2-12. Using \$10/ton of carbon as a lower bound on avoided damage (See Appendix Table 2-13), this process gives a one-time value of avoided damage of US\$500-550/ha for high forest and roughly US\$40/ha for degraded forest. At a discount rate of 10 percent this is equivalent to a perpetual benefit stream of US\$45-50/ha/yr for high forest and US\$4/ha/yr for degraded forest.

D_d = Estimated lower bound on domestic willingness-to-pay for forest benefits. The units are US\$/hectare/year.

D_g = Estimated lower bound on global willingness-to-pay for forest benefits. The units are US\$/hectare/year.

Estimating an upper bound on the cost of forestry operations on each new land parcel brought into forestry, the “Supply Curve.”

For each site class, an upper bound on the cost of forestry operations was calculated according to the following equations. Slightly different methods are used for land which is currently under high forest (S_h) and land which would require reforestation (S_r), due to exigencies of data availability. Although this results in slightly greater accuracy of the calculation, in practice the difference between results obtained using the two methods is small.

$$x = (e_t - e_p) / a$$

$$S_h = x + \alpha_r (c_c i_c + c_b i_b) + \alpha_f (c_f i_f)$$

$$S_r = x + (i_c + i_b) k_r + i_f k_f$$

where:

x = upper bound on fixed cost of forestry operations per hectare of forest land. The calculated value is US\$66/ha/year. This is calculated simply by dividing all General Directorate of Forestry budget expenses not *directly* related to wood production by the current area of high forest. For current high forest, this represents the fixed cost of forestry operations per hectare independent of how much wood is produced there. For reforested land, this number represents an *upper bound* since the addition of a hectare to the total forest would cause some fixed costs (e.g. road maintenance) to increase proportionately to the increase in land area while other fixed costs would increase less than proportionately with forested land area. In other words, per-hectare fixed expenses not directly related to wood production would demonstrate an economy of scale as the forest area grew and would likely fall well below x in an enlarged forest system

e_t = average total annual GDF budget expenditures on the period 1992-1996. The value used is US\$727 million/year. See Appendix Table 2-6.

e_p = average annual GDF budget expenditures directly related to production (production expenditures, wood stocking, and wood sale) on the period 1992-1996. The value used is US\$221 million/year. See Appendix Table 2-6.

a = total area of current high forest: 7,609,583 hectares. See Appendix Table 2-2.

S_h = estimated upper bound on cost of forestry operations per hectare on land which is currently under high forest, (US\$/hectare/year).

S_r = estimated upper bound on cost of forestry operations per hectare on currently degraded forest land which would require reforestation (US\$/hectare/year).

α_r = estimate of the percentage of current all-in roundwood production cost per cubic meter that varies in direct proportion to the amount of wood produced on the site class at hand. The figure used, 30 percent, comes from adding the shares of production expenditures, wood stocking, and wood sale in the total GDF budget (See Appendix Table 2-7). [Note that $\alpha_r = 1 - (e_p / e_t)$.]

α_f = estimate of the percentage of current all-in fuel wood production cost per cubic meter that varies in direct proportion to the amount of wood produced on the site class at hand. The figure used,

50 percent, is a rough estimate made by comparing c_f to Appendix Table 2-8; i.e. the average of the two production-only costs given in Appendix Table 2-8 is roughly half the all-in production cost given in Appendix Table 2-4 (price of fuel wood when sold “at cost”).

c_c = all-in production cost per cubic meter of coniferous wood, averaged across all wood product type costs, weighted by relative wood product production volumes. “All-in” indicates that this cost *includes* fixed costs (which are eliminated from the calculation by the α_r coefficient). The value used, US\$59/m³, is simply the price of a weighted-average cubic meter of coniferous wood when it is sold by the GDF “at cost.” This value represents the US\$57 figure from Appendix Table 2-4 plus an additional 3 percent representing a contribution to the re-forestation fund. This 3 percent is properly part of the production cost since it may be considered an expenditure on maintenance of production capital.

c_b = all-in production cost per cubic meter of broadleaf wood, averaged across all wood product type costs, weighted by relative wood product production volumes. The value used, US\$77/m³, is calculated from Appendix Table 2-4 in the same manner as c_c .

c_f = all-in production cost per cubic meter of fuel wood. The value used, US\$19/m³, is calculated from Appendix Table 2-4 in the same manner as c_c .

k_r = average per-cubic meter expenditures directly related to production of roundwood. The value used, US\$19/m³, is taken from Appendix Table 2-8.

k_f = average per-cubic meter expenditures directly related to production of fuel wood. The value used, US\$12/m³, is taken from Appendix Table 2-8.

Note that the cost curve for hectares of forest thus calculated is technically a Particular Expenses Curve according to Marshall’s original definition in his classic *Principles of Economics*. Such a curve need not have a positive slope on any local region.

Estimating a lower bound on optimal total forest area by summing up the area of all land parcels on which the benefits of forestry are greater than the cost of forestry operations.

Each parcel of land considered in the above analysis has minimum potential rent R_{min} associated with it, the difference between the lower bound on forest benefits and the upper bound on costs of forestry. This is calculated as $R_{min} = D_d - S_h$ or as $R_{min} = D_d - S_r$, depending on whether the parcel is currently under high forest or would require reforestation (respectively). The units of R_{min} are US\$/hectare/year. If, for some hypothetical reason, Turkey could only choose one of the parcels considered in the model to maintain as forest, it would be likely to profit most from selecting the one with the highest R_{min} . If it could then choose one additional parcel, it would likely profit most from selecting the one with the second-to-highest R_{min} , and so on. This process would continue, for parcels with lower and lower R_{min} , until R_{min} fell below zero. Note that since R_{min} is the difference between a lower bound and an upper bound, $R_{min} \geq 0$ guarantees that the true rent $R \geq 0$, whereas $R_{min} < 0$ leaves doubt as to whether the true rent R is positive or not. It would thus be surely profitable for Turkey to maintain as forest all parcels for which $R_{min} > 0$, and it may or may not be profitable to maintain as forest any additional parcels. Thus the total area of all those parcels for which R_{min} is strictly positive is herein referred to as a lower bound on the optimal total forest area.

RESULTS

When the parcels examined are sorted from highest-rent to lowest-rent and plotted with their associated values of D and S , two intersecting curves are generated. Although these curves will be herein referred to imprecisely as demand and supply curves for hectares of Turkish forest, it is important to remember that the “demand curve” in fact represents an a lower bound on the unknown values of the true demand curve and the “supply curve” in fact represents an upper bound on the unknown values of the true supply curve.

The properties of these curves were investigated for two policy scenarios. The *Status Quo* case assumes that no investments in large-scale reforestation are made and there are no international transfers. The only improvements which occur are in forestry practice, where forestry operations come to capture the maximum reasonable sustainable harvest from existing high forest. In the *Improved Policy* case, reforestation of all suitable land occurs and pressure on forestland is eased, for example through growing regularization of the black market in fuel wood. Within the latter case, the effects of international transfers are explored.

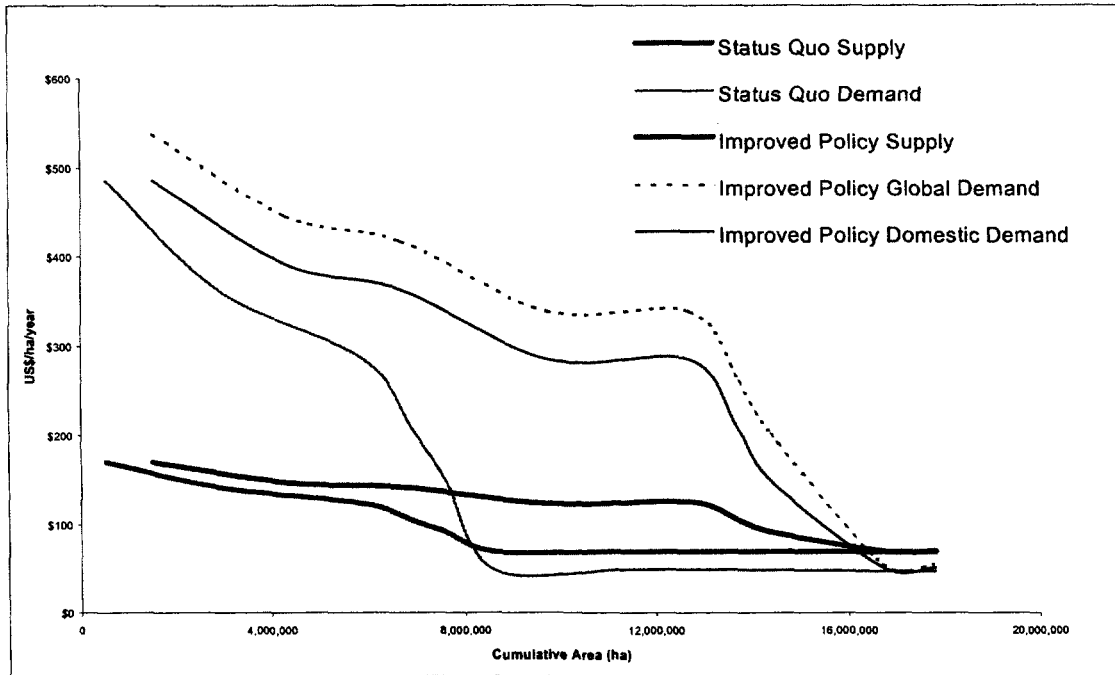
Figure 1 summarizes the analysis. Each pair of quasi-supply and demand curves maps the area of forest land resulting from different policy scenarios. Figure one shows an estimated lower bound on the annual demand curve and upper bound on the annual supply curve for hectares of Turkish forest. In the absence of policy improvements the demand curve shown includes both wood and non-wood domestic benefits. A lower bound on the consumers’ surplus of the status quo is US\$1.32 billion per year and the forest area of 10.5 million is close to the actual area of well stocked forest.

It is noteworthy that the supply curves are downward-sloping, which may surprise those accustomed to seeing upward-sloping supply curves for firms in economics textbooks. As one hectare of land gets less productive, the total benefits of carrying on a forestry operation there decline but so do the costs. It is true that the costs *per cubic meter of wood* increase as land gets less productive per hectare, but the costs *per hectare of land* decrease. Since this is a supply curve for hectares of forest land and not for cubic meters of wood, the downward slope is perfectly natural.

The three improved curves illustrate the potential of policy reform showing an estimated lower bound on annual domestic demand, lower bound on annual global demand, and upper bound on annual supply of Turkish forestland after policy improvements to eliminate impediments to reforestation and relieve pressure on existing forest land. A lower bound on Turkish consumers’ surplus in the improved policy case is US\$2.48 billion/year, and a lower bound on global consumers’ surplus is US\$3.21 billion/year. Above this point lie areas of land not suitable for reforestation, such as Site Class V degraded forest lands and current low-quality pasture lands. The solid lines show supply and demand for forest hectares from a purely Turkish perspective.

The dotted line indicates a lower bound on the *global* demand curve for hectares of Turkish forest. This curve represents a summation of benefits accruing to Turkey only (solid line) and those accruing to the rest of the world. The point of intersection of the dotted line and the supply curve, roughly 15 or 16 million, therefore, is a lower bound on the globally optimal area of Turkish forests—somewhere above this point lies the forest area that maximizes net annual forest benefits to

the whole world (including Turkey). The difference between the global and domestic demand curves comprises a lower bound on carbon storage benefits and on genetic resource benefits.



Figure

DISCUSSION

The fundamental premise of this exercise is that bounds on prices can guide policymakers in taking actions to move the world towards the true social optimum even when the exact location of that optimum is unknown. Several policy questions can, in fact, be answered with reasonable conviction by the lower bounds calculated here. These include: 1) Should Turkey invest in improving forestry practices on currently harvested land? 2) Should Turkey invest in the large-scale reforestation of currently degraded forest land? 3) Should the international community make long-term, recurring payments to Turkey in payment for forest services received? 4) Should the international community provide short-term, one-time assistance to Turkey in the reform of its forest industry structure?

Should Turkey invest in improving forestry practices on currently harvested land?

Yes. Although current state-run forestry is a contributor to the national budget, there is a large untapped potential even in the land on which such harvesting currently operates. Figure 1 suggests that the consumers' surplus of sustainably harvesting the annual increment on current high forest land lies somewhere above US\$1.32 billion per year. This means that investments in the efficiency of all levels of current operations will pay off in the long run.

Should Turkey invest in the large-scale reforestation of currently degraded forest land?

Yes. Figure 2 suggests that rehabilitating roughly seven million hectares of currently degraded forest land for long-term forestry purposes would raise the lower bound on domestic consumers' surplus by US\$1.2 billion per year. This represents roughly double the value added to the Turkish economy by its forests.

Should the international community make long-term, recurring payments to Turkey in payment for forest services received?

No. Following domestic policy improvements, full payment by the international community for the forest services it receives from Turkey would represent an increment to the domestic demand curve faced by Turkish forest policy makers. It would not, however, shift demand enough to significantly affect decisions with regard to optimal forest size. Put simply, the international community has an interest in the reforestation of degraded Turkish forest land but so does Turkey. Turkey incurs no opportunity cost by providing nearly the globally optimal area of forest. There is thus little case for recurring payment in compensation for services received.

Should the international community provide short-term, one-time assistance to Turkey in the reform of its forest industry structure?

Yes. The preceding analysis suggests that in the long term, Turkey will find some way to expand its forest area even if the international community pays nothing. This is simply because it would be profitable to do so. However, it is equally apparent that significant obstacles stand in the way of reform at least for some period of time. Say for example, that imperfect domestic capital markets prevented Turkey from investing in one half of the reforestation that it would optimally undertake based on its domestic incentives. This means that the international community would lose half of the forest benefits it would receive if Turkey *could* finance the reforestation. If the international community could help finance the reforestation, then, it would be willing to pay up to the value of the loss it incurred due to the capital shortage to help eliminate it.

CONCLUSION

The above discussion offers assistance to domestic and international policymakers hindered by large uncertainties in the basic facts they need to make sound decisions. The analysis presented here offers several suggestions.

- By investing in sound forestry practices and the reforestation of degraded lands, Turkey can unlock a large potential source of added value to its economy.
- The international community can best protect its interests by offering one-time assistance to the short-term process of forest sector reform in Turkey, rather than recurring long-term payments for forest services received.
- Both domestic and international policymakers have an incentive to take such actions as move the world towards its true social optimum without waiting skeptically for international markets in carbon storage and pharmaceutical gene banks to emerge.

APPENDIX

The following tables contain the primary data used to make all calculations presented in this annex.

Table 2-1. Area, growing stock, increment and allowable cut figures for Turkish forestland.

Forest Type	Tree Species	Forest Condition	Area		Tree growing stock		Current annual increment		Annual allowable cut total	
			(Ha.)	(%)	(m ³)	(%)	(m ³ /yr)	(%)	(m ³ /yr)	(%)
HIGH FOREST	Coniferous forest	Normal	5 955 120	28.8	720 990 975	61.8	18 998 826	58.6		
		Degraded	3 937 335	19.0	45 150 167	3.9	954 895	2.9		
		Total	9 892 455	47.8	766 141 142	65.7	19 953 721	61.5		
	Broad-leaved for.	Normal	1 414 876	6.8	272 663 862	23.4	6 534 653	20.1		
		Degraded	1 178 461	5.7	16 470 485	1.4	370 897	1.2		
		Total	2 593 337	12.5	289 134 347	24.8	6 905 550	21.3		
	Mixed forest	Normal	638 859	3.1						
		Degraded	720 525	3.5						
		Total	1 353 384	6.6						
	Total	Normal	8 002 855	38.7	993 654 837	85.2	25 533 479	78.7		
		Degraded	5 836 321	28.2	61 620 652	5.3	1 325 792	4.1		
		Total	13 839 176	66.9	1 055 275 489	90.5	26 859 271	82.8	11 700 558	68.1
COPPICE FOREST	- In stere	Normal	2 545 132	12.3	111 987 000		6 494 873			
		Degraded	4 318 814	20.9	36 334 000		948 823			
		Total	6 863 946	33.2	148 321 000		7 443 696		7 299 848	
	- In m ³	Normal	2 545 132	12.3	83 990 250	7.2	4 871 155	15.0		
		Degraded	4 318 814	20.9	27 250 500	2.3	711 617	2.2		
		Total	6 863 946	33.2	111 240 750	9.5	5 582 772	17.2	5 474 886	31.9
GRAND TOTAL	TOTAL (in m ³)	Normal	10 547 987	51.0	1 077 645 087	92.4	30 404 634	93.7		
		Degraded	10 155 135	49.0	88 871 152	7.6	2 037 409	6.3		
		Total	20 703 122	100	1 166 516 239	100	32 442 043	100	17 175 444	100

Source : Turkey's Forest Inventory, OGM, 1999.
Conversion factor from stere to m³ is taken as 0.75.

Table 2-2. Productive High Forest by Site Class (bonitet)

Site Class	Area (Ha)	Assumed MAI (M3/ha/yr)
I	526,466	7.0
II	2,372,299	5.0
III	3,037,491	4.0
IV	1,008,816	3.0
V	664,511	2.0
Total	7,609,583	4.2

Source: Data compiled from 1997 forest inventory, OGM

Table 2-3. Distribution of degraded forest areas by site quality

<u>Site quality index</u>		<u>Area (Ha)</u>
High	(I)	1 000 000
Medium	(II)	2 800 000
Poor-very poor	(III-IV)	3 000 000
Waste lands	(V)	2 300 000
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Total degraded forest area		9 100 000
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Degraded range lands in forest areas		1 100 000
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Grand total		10 200 000
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Source : AGM, Survey and Projects Department, 1998 as cited by Muzaffer Dogru.

Table 2-4. Wood production of the General Directorate of Forestry (OGM) in 1997

Wood production amounts, sale revenues, average sale prices of the General Directorate of Forestry (OGM) in 1997												Source : OGM, 1998 as cited by Muzaffer Dogru			
Sale type	Species group	Item	unit	Saw log	Pole	Mine prop	Industrial wood	Split ind. wood	Pulp wood	Fiber&chip wood	small poles, sticks	ROUND	FUELW	GRAND TOTAL (M3)	
												WOOD TOTAL	OOD (stere) 1		(m3)
Auction sale	Coniferous	Quantity	m3	2240601	40501	353499	524455	67056	326789	109267	14565	3676733	418835	272243	3948976
(at forest		Sale revenue	M.T	28760887	183909	3126586	3957487	332577	1996096	342189	104553	38804284	747410	747410	39551694
Depot)		Average sale	TL	12836238	4540850	8844681	7545904	4959690	6108210	3131677	7178373	10554012	1784413	2745378	10015684
		price	\$	85.57	30.27	58.96	50.31	33.06	40.72	20.88	47.86	70.36	11.9	18.3	66.77
	Hardwood	Quantity	m3	372414	--	44892	77297	86925	1292	72617	-	655437	572320	372008	1027445
		Sale revenue	M.TL	5327429	-	337378	1189238	625739	8323	304868	-	7792975	1196259	1196259	8989234
		Average sale	TL	14305125	-	7515326	15385306	7198608	6441590	4198301	-	11889739	2090193	3215681	8749110
		Price	\$	95.37	-	50.1	102.57	47.99	42.95	27.99	-	79.26	13.93	21.44	58.33
	Total	Quantity	m3	2613015	40501	398391	601752	153981	328081	181884	14565	4332170	991155	644251	4976421
		Sale revenue	M.TL	34088316	183909	3463964	5146725	958316	2004419	647057	104553	46597259	1943669	1943669	48540928
		Average sale	TL	13045500	4540851	8694880	8552900	6223599	6109520	3557526	7178373	10756101	1961010	3016944	9754100
		Price	\$	86.9	30.27	57.96	57.01	41.49	40.73	23.72	47.86	71.7	13.07	20.11	65.02
Sale at cost	Coniferous	Quantity	m3	79816	48	506	20	-	96	91	-	80577	207994	135196	215733
Price (to		Sale revenue	M.TL	686520	487	3369	101	-	352	403	-	691232	350606	350606	1041838
Forest		Average	TL	8601283	10145833	6658103	5050000	-	3666667	4428571	-	8578527	1685654	2593316	4828398
Villagers)		price	\$	57.34	67.64	44.39	33.67	-	24.44	29.52	-	57.19	11.24	17.29	32.19
(depot or	Hardwood	Quantity	m3	1635	-	141	-	46	-	190	-	2012	112232	72950	74962
Road side)		Sale revenue	M.TL	20177	-	1296	-	337	-	386	-	22645	212022	212020	234668
		Average sale	TL	12340673	-	9141490	-	7326087	-	4400000	-	11255467	1889140	2906400	3130493
		price	\$	82.77	-	61.28	-	48.84	-	29.33	-	75.04	12.6	19.37	20.89
	Total	Quantity	m3	81451	48	647	20	46	96	281	-	82589	320266	208146	290735
		Sale revenue	M.TL	706697	487	4665	101	337	352	1239	-	713878	562628	562628	1276506
		Average sale	TL	8676345	10145833	7210200	5050000	7326087	3666667	4409252	-	8643742	1756750	2703045	4390617
		price	\$	57.84	67.64	48.07	33.67	48.84	24.44	29.4	-	57.62	11.71	18.02	29.27

**Table 2-5. Distribution of wood sales by type of wood
(as % of total sale volumes) for 1976 - 1996 period**

Wood product										
Year	Saw log	Pole	Mine prop	Indust. Wood	Pulp Wood	Fiber& Chip wood	small poles, sticks	Round Wood total	Fuel wood Total	GRAND TOTAL (M3) ²
Distribution of wood sale volumes by products as percentage (%) of total sale volumes										
1976	28.59	0.49	3.64	2.77	-	-	-	35.49	64.51	100.00
1977	23.90	0.57	3.13	1.30	5.07	0.98	-	34.95	65.05	100.00
1978	24.20	0.76	2.65	1.20	3.71	1.02	-	33.54	66.46	100.00
1979	24.14	0.60	3.00	1.34	5.66	0.88	-	35.62	64.38	100.00
1980	22.32	0.81	2.11	1.53	3.59	0.92	-	31.28	68.72	100.00
1981	21.93	0.53	3.06	1.63	5.72	1.17	-	34.04	65.96	100.00
1982	24.67	0.42	3.01	1.76	5.69	3.78	-	39.33	60.67	100.00
1983	21.97	0.70	3.28	2.22	5.90	3.75	-	37.82	62.18	100.00
1984	22.71	0.81	3.01	2.47	7.90	5.56	-	42.46	57.54	100.00
1985	24.18	1.13	3.10	1.93	9.48	5.81	-	45.63	54.37	100.00
1986	24.82	1.55	3.25	2.42	9.08	6.39	-	47.51	52.49	100.00
1987	24.00	1.24	3.69	2.58	9.62	5.95	-	47.08	52.92	100.00
1988	23.01	0.54	3.59	2.29	10.09	7.01	-	46.53	53.47	100.00
1989	23.45	1.16	2.91	2.78	11.50	7.58	-	49.38	50.62	100.00
1990	26.23	0.54	5.12	4.13	7.89	7.35	-	51.26	48.74	100.00
1991	22.61	0.71	3.33	4.46	7.47	7.90	-	46.48	53.52	100.00
1992	21.25	0.80	3.49	4.42	7.51	8.28	0.21	45.96	54.04	100.00
1993	21.96	1.01	3.22	5.92	10.65	6.87	0.13	49.76	50.24	100.00
1994	25.63	0.84	3.64	5.69	11.63	6.95	0.32	54.70	45.30	100.00
1995	23.14	0.77	3.23	6.29	9.66	10.18	0.17	53.44	46.56	100.00
1996	23.52	0.80	3.44	6.96	8.32	9.58	0.16	52.78	47.22	100.00

Source : OGM, 1998

Prepared by M. DOGRU

**Table 2-6. Expenditures of General Directorate of Forestry
(Revolving Capital Budget + Added Budget) By Expenditure Category 1992-1996**

Expenditure category	1992	1993	1994	1995	1996
	(million TL.)				
1. Production expenditures	1295310	2377657	3509713	9071696	18046712
2. Wood stocking expenditures	211480	271715	755043	1066876	2760898
3. Wood sale expenditures	12619	95232	69382	113340	433736
4. Cadastral surveys	13386	27578	34428	29970	97739
5. Forest maintenance expenditures	1257750	2622776	3157115	6485843	10091484
a. Silvicultural implementations	492609	1021288	1200017	2153860	3358472
b. Forest protection	480870	992140	1244508	2990335	4374547
c. Forest mapping and planning	9122	17044	33789	73733	138858
d. Road construction and maintenance	275149	592301	658801	1267915	2219915
6. Repair shops (for forest machinery)	38003	116739	198146	349553	576037
7. General administrative expenditures	1682933	2792713	4385590	7942426	17791652
a. Salaries	1438007	2324407	3667385	6542847	14146154
b. Other recurrent expenditures	244836	468306	717642	1399579	3645498
8. Depreciation (i.e. buildings, vehicles)	15464	26160	21902	106666	401319
9. Auxiliary services	145562	435590	379788	675271	762503
10. Transfers	530481	914027	2876645	7376101	8786654
11. Other expenditures	26065	12275	146637	152887	42308
TOTAL	5229053	9692462	15513826	33370629	59782102

Source : GDF, 1998

Table 2-7. Expenditures of General Directorate of Forestry as % of total (Revolving Capital Budget + Added Budget) By Expenditure Category 1992-1996

Expenditure category	1992	1993	1994	1995	1996	Average
	% of total annual expenditures					
1. Production expenditures ¹	24.77	24.53	22.6	27.18	30.18	25.86
2. Wood stocking expenditures	4.04	2.80	4.87	3.20	4.62	3.91
3. Wood sale expenditures	0.24	0.98	0.45	0.34	0.73	0.55
4. Cadastral surveys	0.26	0.29	0.22	0.09	0.15	0.20
5. Forest maintenance expenditures	24.05	27.06	20.22	19.44	16.88	21.53
a. Silvicultural implementations ²	9.42	10.54	7.74	6.46	5.62	7.96
b. Forest protection ³	9.20	10.23	8.02	8.96	7.32	8.75
c. Forest mapping and planning	0.17	0.18	0.22	0.22	0.23	0.20
d. Road construction and maintenance	5.26	6.11	4.24	3.80	3.21	4.62
6. Repair shops (for forest machinery)	0.73	1.21	1.28	1.05	0.96	1.05
7. General administrative expenditures	32.18	28.81	28.27	23.80	29.76	28.56
a. Salaries	27.50	23.98	23.64	19.61	23.66	23.68
b. Other recurrent expenditures ⁴	4.68	4.83	4.63	4.19	6.10	4.88
8. Depreciation (i.e. buildings, vehicles)	0.30	0.27	0.14	0.32	0.67	0.34
9. Auxiliary services	2.78	4.49	2.45	2.02	1.28	2.60
10. Transfers ⁵	10.15	9.43	18.54	22.10	14.70	14.98
11. Other expenditures	0.50	0.13	0.94	0.46	0.07	0.42
TOTAL	100.00	100.00	100.00	100.00	100.00	100.00

Source : GDF, 1998

Prepared by M. DOGRU

¹ *Felling, extraction, transportation*

² *Tending, thinning, regeneration etc.*

³ *Against fire, insects and diseases etc.*

⁴ *Office expenditures, mail electricity etc.*

⁵ *Treasury share, corporation tax, payments to various forestry funds (reafforestation fund, forest villagers development fund) and non-forestry funds.*

Table 2-8. Wood production unit costs for principal wood products, 1998

Operation	Logs, poles		Chip & fiber wood		Fuel wood		TL/m3	\$/m3
	TL/m3	\$/m3	TL/m3	\$/m3	TL/stere	\$/stere		
1. Measurement	215 200	0.85	-	-	-	-	-	-
2. Felling, crosscutting	933 000	3.60	670 000	2.60	510 000	1.96	785 000	3.00
3. Extraction, piling at the roadside	1 600 000	6.15	1 830 000	7.00	900 000	3.46	1 385 000	5.30
4. Transportation (to depot)	2 000 000	7.70	1 530 000	5.90	1 000 000	3.85	1 540 000	5.90
5. Stocking at depot	186 200	0.70	1 80 000	0.70	123 000	0.47	190 000	0.80
TOTAL*	4 934 000	19.00	4 210 000	16.20	2 533 000	9.74	3 900 000	15.00

Source : OGM, 1998 Budget Book

* in addition 10 % premium payment is made to forest workers, successful and timely completion of production operations.

Table 2-9. Distribution of growing stock in normal high forests by age class

Rotation age (year)*	Plan period (year)	Number of plan period	Management class	Total forest (Ha.)	high area	Total growing stock of all age classes (m3)
			Juniper	16929,5		1 145 604
			P. pinea	8820,5		524 905
100	20	5	P.nigra	1904888,7		228 303 453
30			P.pinaster	52320,9		1 215 813
25			P.radiata	92,0		0
100	20	5	P. silvestris	656418,6		83 337 650
60	10	6	P.brutia	2380383,0		182 196 927
60	10	6	Fraxinus	3532,5		242 514
100	20	5	Abies sp.	23159,5		2 933 252
			Carpinus	892,0		146 180
			Betula	11,0		0
60	10	6	Tilia	1986,5		277 744
120	20	6	Fagus	1076093,1		195 711 589
60	10	6	Castanea	7190,5		788 575
10	10	1	Poplar sp.	5260,3		0
40	10	4	Alnus sp.	1703,5		87 409
50	10	5	"	6990,0		951 509
50	10	6	"	1135,5		100 572
60	10	6	"	21788,0		1 688 558
100	20	5	Picea	173521,5		39 784 509
			Quercus	11731,5		0
100	20	5	"	53874,5		8 155 005
120	20	6	"	44992,5		7 091 606
140	20	7	"	63561,6		10 679 851
160	20	8	"	7012,0		1 270 668
200	20	10	"	9899,8		1 737 198
10	10	1	Eucalyptus	630,5		5 167
100	20	5	Cedrus	130857,3		15 952 191
60	10	6	Liquidambar	963,0		42 739
			Salix sp.	16,0		0
			Cupressus	391,0		0
T O T A L				66671447		781
				046.8		

Source : Statistics and Evaluation Division of MOF, 1998

* Average rotation age

Table 2-10. Distribution of normal high forest areas by site quality class

Management class	Area of normal high forest (Ha)*	Area by site quality classes (ha)**					
		I	II	III	iV	V	
Juniper	16 929.5	4.0	94.5	12 826.5	0.0	0.0	
P.pinea	8 820.5	213.5	3 653.0	3 890.5	0.0	0.0	
P.nigra	1 904 888.7	20 311.5	166 979.3	566 899.3	714 822.4	426 516.2	
P.maritima	52 320.9	1 331.5	27 832.9	17 099.5	592.5	0.0	
P.radiata	92.0	0.0	0.0	0.0	0.0	0.0	
P. silvestris	656 418.6	60 799.5	264 145.0	329 068.1	0.0	0.0	
P.brutia	2 380 383.0	291 070.3	1 130 435.6	946 414.6	0.0	0.0	
Fraxinus sp.	3 532.5	1 906.5	508.5	0.0	0.0	0.0	
Abies sp.	23 159.5	900.0	4 474.5	2 856.5	11 887.5	3 041.0	
Carpinus	892.0	653.5	0.0	0.0	0.0	0.0	
Betula	11.0	0.0	0.0	0.0	0.0	0.0	
Tilia sp.	1 986.5	0.0	1 334.5	123.5	0.0	0.0	
Fagus	1 076 093.1	114 524.6	553 270.5	390 251.0	0.0	0.0	
Castanea	7 190.5	199.5	5 040.5	1 303.0	0.0	0.0	
Poplar sp.	5 260.3	0.0	62.0	111.5	1 006.5	0.0	
Alnus sp.	31 617.0	2 483.5	13 501.5	15 632.0	0.0	0.0	
Picea orient.	173 521.5	3 736.5	30 232.0	85 507.0	45 003.5	8 615.0	
Quercus	191 071.9	11 268.1	71 706.4	76 262.4	12 809.1	2 998.9	
Eucalyptus	630.5	0.0	0.0	0.0	630.5	0.0	
Cedrus libani	130 857.3	306.0	7 477.5	46 358.1	55 049.2	21 666.5	
Selective cutting system	232 949.0	3 042.5	32 192.5	71 264.5	74 494.5	50 353.0	
Liquidambar	963.0	721.0	242.0	0.0	0.0	0.0	
Salix	16.0	0.0	0.0	0.0	0.0	0.0	
Cupressus	391.0	0.0	0.0	0.0	0.0	0.0	
TOTAL	2551	766.5	466.5	335.5	568.5	403	

Source : Statistics and Evaluation Division of MOF, 1998.

* includes other than production forests (i.e. protection forests)

** only production forests

Table 2-11. Ratio of total volume to merchantable volume (U.S.)

Ratio of total volume (1) to merchantable volume(2)						
Region	Above-ground ratio(3)		Below-ground proportion(4)		Ratio(5)	
	Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Southeast	1.408	1.793	0.163	0.197	1.682	2.233
South Central	1.495	2.304	0.163	0.197	0.786	0.869
Northeast	1.82	1.808	0.17	0.155	2.193	2.14
Mid Atlantic	1.82	1.808	0.17	0.155	2.193	2.14
North Central	2.087	2.043	0.17	0.155	2.514	2.418
Central	2.159	2.24	0.17	0.155	2.601	2.651
Rocky Mountain	1.898	1.871	0.158	0.155	2.254	2.214
Pacific Coast	1.41	1.926	0.158	0.155	1.675	2.279

1 Volume of all above- and below-ground tree biomass foliage, bark, roots, and root bark.
2 The gross volume of the central stem from a 1-foot stump to a minimum 4.0 inch top diameter outside bark, or to the point where the central stem breaks into limbs; less deductions for rot, roughness, or poor form; for live trees of commercial species at least 5.0 inches d.b.h., and meeting specified standards of quality.
3 The ratio of total above-ground tree biomass to merchantable tree biomass from Cost and others (1990) and other Forest Service reports.
4 The proportion of total above- and below-ground biomass below the ground (Koch 1989).
5 The ratio of total volume to merchantable volume = data column 1 or 2 adjusted for the below-ground proportions (e.g., col. 5 = col.1 divided by [1 - col. 3]).

Source: Richard A. Birdsey, *Carbon Storage and Accumulation in United States Forest Ecosystems*, United States Department of Agriculture Forest Service. General Technical Report W0-59 August 1992.

Table 2-12. Conversion of tree volume to carbon (U.S.)

Factors to convert tree volume (cubic feet) to carbon (pounds)							
Region	Forest Type	Specific gravity (1)		Percent Carbon (2)		Factor (3)	
		Softwood	Hardwood	Softwood	Hardwood	Softwood	Hardwood
Southeast and South	Pines	0.51	0.639	0.531	0.497	16.9	19.82
	Oak-hickory	0.536	0.639	0.531	0.479	17.76	19.82
Central	Oak-pine	0.523	0.639	0.531	0.497	17.33	19.82
	Bottomland hardwoods	0.46	0.58	0.531	0.497	15.24	17.99
Northeast and Mid-Atlantic	Pines	0.378	0.543	0.521	0.498	12.29	16.87
	Spruce-fir	0.369	0.525	0.521	0.498	12	16.31
Mid-Atlantic	Oak-hickory	0.374	0.636	0.521	0.498	12.16	19.76
	Maple-beech- birch	0.384	0.6	0.521	0.498	12.48	18.65
	Bottomland hardwoods	0.46	0.58	0.521	0.498	14.96	17.99
North Central and Central	Pines	0.421	0.53	0.521	0.498	13.69	16.47
	Spruce-fir	0.351	0.48	0.521	0.498	11.41	14.92
	Oak-hickory	0.416	0.632	0.521	0.498	13.52	19.64
	Maple-beech	0.372	0.576	0.521	0.498	12.09	17.9
	Aspen-birch	0.37	0.465	0.521	0.498	12.03	14.45
	Bottomland hardwoods	0.46	0.58	0.521	0.498	14.96	17.99
Rocky Mountain and Pacific Coast	Douglas-fir	0.473	0.38	0.512	0.496	15.11	11.76
	Ponderosa pine	0.416	0.38	0.512	0.496	13.29	11.76
	Fir-spruce	0.349	0.38	0.512	0.496	9.8	10.67
	Hemlock-Sitka sp.	0.434	0.433	0.512	0.496	12.17	12.16
	Lodgepole pine	0.423	0.38	0.512	0.496	11.86	10.67
	Larch	0.508	0.433	0.512	0.496	14.26	12.16
	Redwoods	0.416	0.58	0.512	0.496	11.68	16.29
Hardwoods	0.424	0.384	0.512	0.496	11.9	10.77	

1 Weighted average specific gravity of the three most common (in terms of volume) softwood or hardwood species within the forest type.

2 From Koch (1989).

3 Factor = specific gravity times the weight of a cubic foot of water (62.4 lbs.) times percent carbon.

Source: Richard A. Birdsey, *Carbon Storage and Accumulation in United States Forest Ecosystems*, United States Department of Agriculture Forest Service. General Technical Report WO-59 August 1992.

Table 2-13. Marginal damage of one ton of carbon released into the atmosphere

(in US\$/ton of C)

<u>Study</u>	<u>Type</u>	<u>1991-2000</u>	<u>2001-2010</u>	<u>2011-2020</u>	<u>2021-2030</u>
Nordhaus (1991)	MC		7.3 (0.3-65.9)		
Ayres and Walter (1991)	MC		30-35		
Nordhaus (1994), DICE	CBA				
-certainty/best guess		5.3	6.8	8.6	10.0
-uncert./ exp. value		12.0	13.0	8.6	n.a.
Cline (1992b)	CBA	5.8-124	7.6-154	9.8-186	11.8-221
Peck and Teisberg (1992,1993)	CBA	10-12	12-14	14-18	18-22
Fankhauser (1994)	MC	20.3 (6.2-45.2)	22.8 (7.4-52.9)	25.3 (8.3-58.4)	27.8 (9.2-64.2)
Maddison (1993)	CBA/ MC	5.9-6.1	8.1-8.4	11.1-11.5	14.7-15.2

Source: Samuel Fankhauser, *Economic Estimates Of Climate Change Impacts*, Global Change Research Information Office. Downloaded November 18, 1998.

ANNEX 3: DRAFT TERMS OF REFERENCE – PILOT MULTI-PURPOSE FOREST MANAGEMENT PLANNING

As discussed in the main text of this Forestry Sector Review, conventional forest management planning in Turkey is largely limited to timber production concerns and does not adequately address the full range of forest products and services. The discussion in the text is necessarily general, precisely because forest management options and strategies are highly site specific and can only be addressed in detail in reference to particular sites, users, institutions and policies. To advance consideration of policy reforms that would promote multi-purpose forest management in Turkey, one option would be to commission pilot forest management planning projects for selected forest management units with the specific intention of systematic consideration of a broad range of potential objectives. If conducted on a sufficient range of cases, such pilots could provide evidence of the significance of a multi-purpose approach, the costs and resource implications of a broadened planning approach, the benefits that might result from replication, and the policy, institutional, investment measures needed to permit systematic adoption. These draft terms of reference are intended to enable consideration of the feasibility of such a pilot effort and could be integrated into preparation of a broad natural resource management sector investment program.

Site Selection. Based on resources available for the pilot exercise, a number of forest management units would be selected for analysis. As a group, the areas selected for examination would reflect a range of forest types, management issues, resource conditions and socio-economic circumstances as well as variety of demands by different stakeholders. As noted in the Forestry Sector Review, a large number of OGM forest management districts show consistently poor financial results and would be especially desirable candidate sites.

Planning Methodology. The pilot planning exercise would consist of five components aimed at identifying for each forest management unit under consideration the most socially desirable management objectives and combination of uses. Each would be a multidisciplinary effort conducted by a small team working in cooperation with the current management team and interested stakeholders. The teams would specifically not be expected to follow existing Turkish guidelines and standards for forest management planning, but would apply best practice in multi-resource planning from international experience and standard methods of resource assessment and project design and evaluation.

Multiple Resource Assessment and Inventory. For most OGM forest management units, timber inventory data is reasonably complete and current. To the extent needed, the conventional timber resource assessment could be updated as part of the planning exercise, but more emphasis would be placed on the development of a comprehensive picture of the area's overall forest resources. This would be based on rapid assessment of wildlife resources, recreational uses and potential, cultural and archeological assets, water resources, plant resources other than trees and forest species and developed infrastructure such as roads, water supply systems and other investments. The resource assessment could involve limited field investigations and consultations with local communities and others familiar with the site. It could also involve secondary research

based on literature reviews and consultation with experts familiar with similar settings. It is critical that this assessment take note of seasonal considerations, such as the site being part of a migratory system or breeding ground, etc. The results of this component would be maps and tabular data showing the important resources of the management unit (conventional forest inventory results such as areas of different forest types, species, stocking, age and size class distributions, etc.) and providing, where possible quantitative estimates of growth potential (e.g. site index), recruitment, and potentially sustainable levels of use. This data would be summarized into a short text suitable for distribution to concerned stakeholders that would describe the site and its potential for sustainable production of whatever forest resources are present.

Assessment of Current Management System. As all potential sites are under some form and intensity of management, a key element of the pilot exercise would be an analysis of the current management program. This aspect would involve summarizing the current management program (harvest levels, investment, silvicultural prescriptions, expenditure, receipts, etc.), consulting with involved and affected stakeholders (forest management staff, forest workers, local communities, forest industries and local wood processors and consumers, non-governmental organizations, occasional and potential users) to assess their views and evaluation of management performance, identifying legal and regulatory restrictions and constraints on management choices (for example, land use controls). The results of this component would include a summary of stakeholder opinions, detailed financial calculations on recent (5 year) results covering all marketed outputs and all managerial inputs.

Development of Management Alternatives. Based on the foregoing analysis, the team would prepare detailed alternative management prescriptions based on the potential of the site. At a minimum, these would include a continuation of the current management program (generally timber oriented), a reduction of management effort to the minimum level of effort needed to ensure protection of the area from fire and encroachment but (without active silviculture or harvesting), but would also include alternatives placing priority on management for non-timber purposes. Normally, it could be anticipated that alternatives will include management for wildlife, for timber production strategies significantly different from the current program (different rotations, product combinations, species mix changes, silvicultural regimes, etc), significant alterations in operational practice (labor contracting, arrangements for contracting of forest operations, road layout and design), greater provisions for non-forest users and uses (livestock grazing, recreational users, hunting, downstream water yield, etc.). The management alternatives would not need to be, and generally would not, be single purposed and could involve compartmentalization of the management unit into zones or working circles assigned to specific treatments or primary uses.

In the process of developing alternatives, it would be expected that the team would consult with the stakeholders mentioned above and estimate the demands of different products and services at local and national levels for the present as well as future periods. The output of this component will be detailed outlines of management options including a description of the program, demonstration of its technical feasibility and environmental sustainability feasibility, and estimates of the costs and benefits associated with each alternative. It should be emphasized that the purpose of this exercise is not the detailed determination, for example, of optimal rotation ages, silvicultural prescriptions, planting densities or thinning regimes. These are relevant as they determine the

overall feasibility and desirability of management alternatives, but the analysis should focus on the larger management question of the management objective for the site.

Evaluation of Alternatives. Based on the feasible alternatives identified for the management of the forest unit, at least the most promising alternatives would then be evaluated to identify from a variety of perspectives the most desirable options. This evaluation would include an economic and financial analysis applying standard methodologies of discounted cash flow and, where needed, shadow pricing of under-priced values. It would also include participatory workshops and consultations with key affected groups. To the extent indicated by the preliminary design, it would also include analysis of technical feasibility and environmental impact. The output of this component would be a recommendation of the most socially desirable management alternative(s) for the site. To the extent that a single alternative can not be recommended, the analysis would provide specific discussion of the tradeoffs between the most promising alternatives and an attribution of the benefits of the dominant alternatives to different stakeholders and groups (e.g. forest village communities, national budget, forest industry, recreational users, downstream residents). The analysis would also identify any legal, policy, institutional, regulatory or budgetary constraints to the pursuit of the most desirable management strategy (e.g. limits on land use change, limits on public involvement, credit limitations).

Assessment of Policy and Investment Implications. While the revised management prescriptions that might result from this work are useful in their own right, more important from the point of view of policy and institutional reform is that the implications and transferability of these results be assessed. If the analysis, as expected, identifies preferable management alternatives to the ones now being pursued, the exercise needs to be supplemented with an analysis of why these preferred options have not been implemented. This component should consider whether preferred options had simply not been identified due to lack of analysis or whether there are systematic constraints, such as inappropriate planning or management guidelines, policy restrictions, legislative or regulatory provisions, or other factors which prevent adoption. Moreover, the analysis needs to be extended to consider the overall investment implications if these constraints were to be relaxed and a multi-purpose planning approach applied over a broader area.

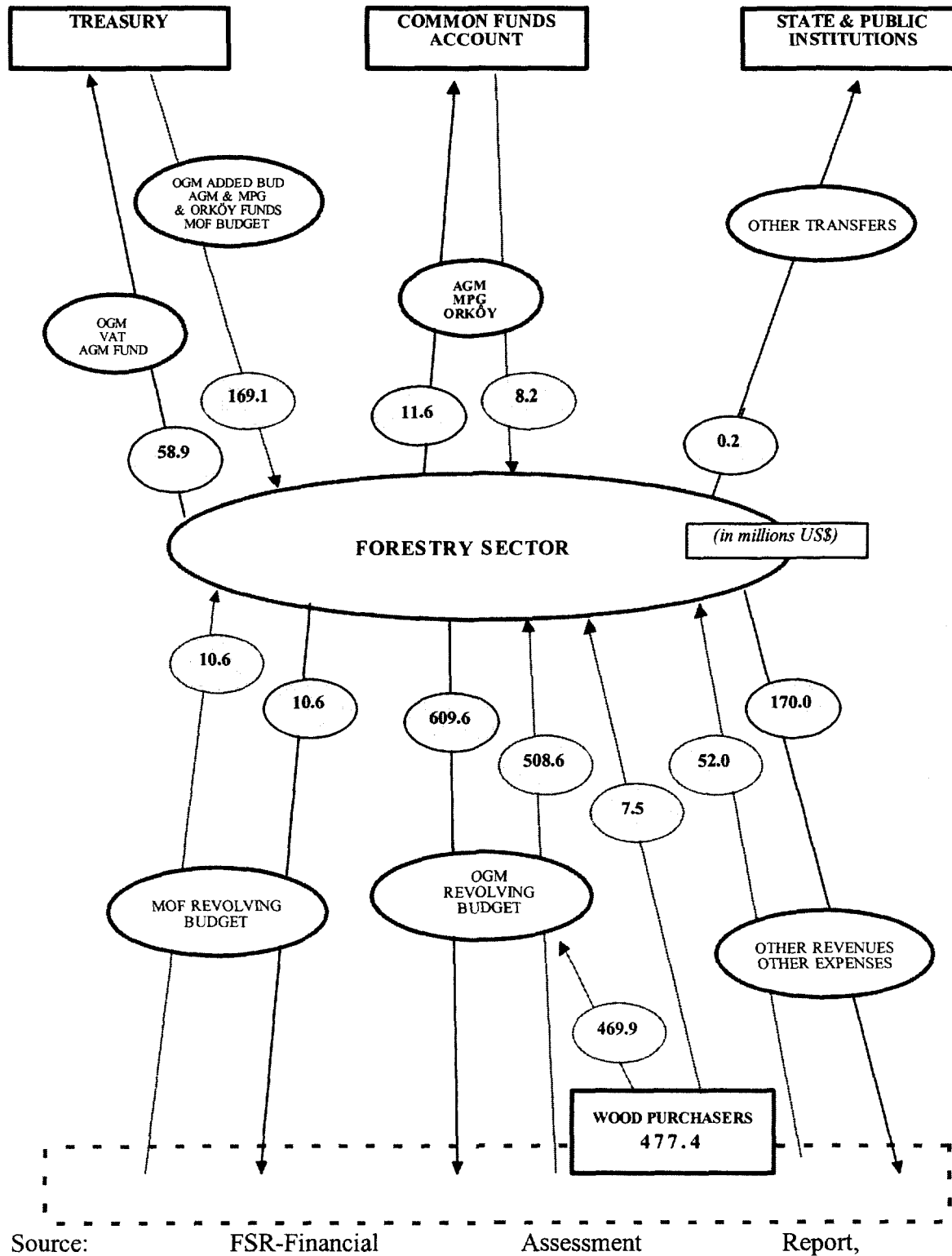
Team Composition and Management. A multidisciplinary team with expertise in forest management, forest resource assessment, wildlife management, financial and economic analysis, social science, law and environmental assessment would be needed to conduct each forest management unit assessment. The team leader should have experience in forest management and exposure to community forestry methods and issues. Depending on the number of sites, an overall management committee would be needed and could represent the key national government agencies concerned with forest policy reform and sectoral development including the Ministry of Forests, OGM, AGM, ORKÖY, National Parks and Wildlife, Department of Finance, MARA and Ministry of Environment. Cooperation and collaboration with relevant NGOs should also be considered.

Costs and Financing. Most expertise required for the study is available in Turkey and only limited international technical assistance would be needed. The need for consultant services would largely be determined by the ability of the participating agency to designate full time staff to the planning project and of the level of participation that is provided by the field staff of the existing

forest management units. Modest support would also be required for incremental operating costs, workshops and report publication.

For a typical OGM management unit, it could be expected that a total of approximately 9 months of specialist input would be required. Synthesis of these findings and extraction of the policy reform implications based on a minimum of four cases would require an additional 4 months by an experienced forest policy analyst with international experience in forest management and planning leading to a total input of approximately 40 months plus costs for stakeholder consultations, etc.

ANNEX 4: FINANCIAL FLOWS IN THE FORESTRY SECTOR (1997)



ANNEX 5: BIODIVERSITY IN TURKEY

Table 5-1. Plant and Animal Species in Turkey

Plant and Animal Groups	Described Species	Endemic Species	Rare and Endangered	Extinct Species
Plants (Non-vascular)				
Algae	4,500			
Mosses	234			
Plants (Vascular)	8,950	3072	3011	12
Ferns	78	1		
Seed plants	8,869			
Gymnospermae	22	3		
Angiospermae	8,850	3068		
Monocotyledons	692			
Dicotyledons	8,155			
Animals				
Invertebrates	160,000			
Unicellular	65			
Nematodes	1			
Molluscae	190			
Crustaceae	556			
Fish	508	2	17	
Amphibians	22	2		
Reptiles	105,451	4	5	
Birds	132		39	1
Mammalian		1	25	7

Source: Biodiversity Assessment, Strategy, and Action Plan- Turkey, 1997

ANNEX 6: EASTERN ANATOLIA WATERSHED PROJECT

Eastern Anatolia Watershed Rehabilitation Model for Participation

Turkey has been one of the regional leaders in piloting participatory approaches to natural resource management in poor, mountainous rural areas. The Eastern Anatolia Watershed Rehabilitation Project has been under implementation since 1993. It was financed by the Turkish Government for a total cost of US\$115 million, with an IBRD loan of US\$70 million. This project addresses the problems of rural poverty and natural resource degradation in the remote resource-poor mountainous regions. It helps to restore sustainable forest, range and farming activities in the upper watersheds, reducing soil degradation, erosion and sedimentation in reservoirs as well as increasing productivity and income. These objectives are pursued through several initiatives: i) to improve productivity of range and forest land; ii) to promote the production of fuelwood, cultivated fodder, and more sustainable use of marginal farm lands; iii) to facilitate the adoption of treatments for range and forest land by funding selected supporting activities designed to yield quick benefits; and iv) to ensure increased responsibility and involvement of local communities in the planning and management of their resources.

The Project views natural resource degradation as a multi-sectoral problem, requiring location-specific, multi-sectoral, microcatchment-based solutions. It introduces a variety of small agricultural and infrastructural interventions demanded by the rural communities and assists in increasing their incomes on their land. The rationale behind the interventions is that the degradation can be controlled only through such an integrated multi-sectoral approach to resource management. The reforestation, irrigation and livestock components are mutually reinforcing; they add up to more than the sum of the individual parts. The impact of the project agencies is greater when their individual operations are used in a complementary manner. The design also recognizes that the natural resource degradation in the upper watersheds is intertwined with the problems of poverty and low productivity crop and livestock production of the farm families living in the areas surrounding the forests. It also recognizes that the entire problem of resource management requires a sequential, iterative approach.

The Project depends on the participation of the villagers living in the watershed area. Participation by micro-catchment (MC) communities that have indicated willingness and capacity to become involved with the project is undertaken using *Farmer Centered-Problem Census-Problem Solving (Sor-Sap-Coz)*. Conducted in the village or hamlet, this is a non-threatening, focused discussion that uses small group dynamics to elicit (a) a complete and ranked census of the real and perceived problems of individual households, hamlets, and the village as a whole, and (b) the community's proposed solution to these problems. This approach provides the setting in which all members of the community can contribute. No problem is rejected and all solutions are considered. The final ranking of problems and preferred solutions are theirs. The Project's contribution is limited to facilitating the creation of the setting in which the *Sor-Sap-Coz* approach can be conducted. Project staff only explain the process. They do not take part in the discussions nor make promises.

The output of group work far exceeds the sum of information, experiences and options contributed by individuals. Each group member gains from this shared experience, both in receiving new knowledge and in increased social awareness. For example, a farmer initially may consider a particular problem of paramount importance, but his view may change in favor of problems raised by other farmers. This compromise is made by many farmers, and is the first step toward group consensus. Consistent with small group theory, once the group agrees to take specific action arising from the problem census, the majority of the members are committed and social mechanisms which normally operate in the village situation ensure that all farmers attending the discussion group are committed to the action.

The planning of investments and activities to achieve the objectives in each MC is a joint effort between the concerned villagers and three ministries, the Ministry of Forestry (in particular, AGM and ORKÖY), the Ministry of Agriculture (General Directorate of Production and Development), and the General Directorate of Rural Services. The project evoked a behavioral change in the three ministries operating in the project areas, so that the services of each are now being made specific to the particular local needs, as they vary from village to village and evolve over time, depending on the community demands. For the first time, the provincial agencies worked together to develop integrated programs on a particular geographical area, the MC.

The Project also creates rural employment. Members of the MC communities are paid by the Ministry of Forestry for the work they do for afforestation activities (terrace construction, tree planting, and maintenance), and for gully rehabilitation (stone wall or live fence construction). The community also benefits from working as labor hired by the contractors who construct small-scale irrigation. Skilled and experienced community members are hired as “master grafters” to graft the wild pistachio, almond and cheery trees in the MCs to obtain economic benefit.

The Project:

- restores deforested land, in some cases to productive use (e.g., oak coppice rehabilitation);
- mitigates the environmental impacts of deforestation (e.g., restores the vegetative cover, constructs terraces, rehabilitates erosion gullies);
- reduces the gap between supply and demand for fodder and wood (e.g., oak coppice rehabilitation, forage production on rainfed and irrigated lands, rangeland rehabilitation);
- generates income for rural communities (e.g., beekeeping, horticultural production);
- reduces the social conflict between government agencies and local community stakeholders, who make joint decisions in preparing and implementing the MC plans;
- increases the responsiveness of rural services to farmers’ needs (e.g., foresters plant fruit-bearing trees instead of coniferous species, rural services people develop water resources selected by the villagers);

- provides incentives for MC communities to protect forest land, rangeland, and farmland, providing a menu for alternative new income generating activities and partly financing these;
- works with the Ministry of Forestry to protect forest land .

It has been observed that involvement of local communities in decision making and implementation of the MC plans has a positive effect on protection of the forest resources. In newly afforested areas, MC communities protect forests, for the following reasons:

- Afforestation and oak coppice rehabilitation activities are carried out on the part(s) of the degraded forestland which were determined by the majority of the MC community.
- Most of the villagers themselves work as labor in tree planting/seeding and become emotionally attached to these plants once they plant them with their own will and hands.
- Afforestation and oak coppice rehabilitation activities provide rural employment. Therefore, people respect and become indebted to the Project which provides “bread” for their family.
- Villagers become more aware of the dangers and risks of degrading the forests. They witness that the rehabilitation activities stop floods and landslides.
- For afforestation activities, foresters select tree species after consulting with the rural community. Based on the villagers’ demand, trees which can be utilized by villagers are planted, such as acacia trees (*Robinia pseu-doacacia*) which support beekeeping, almond trees, and wild sweet and sour cherry trees which are grafted by the villagers later to get edible and marketable products.

Some interventions, such as grafting of wild fruit trees, have yielded unforeseen benefits to the forests as a result of community participation. Wild fruit trees, mostly scattered in forest areas, have no economic value. The MC community see no problem grazing their goats and sheep in these areas. However, once these trees are grafted, following demand originating from the villagers, the forest land becomes very valuable for the MC community, who cease letting their animals into those areas. This has two benefits: i) both grafted wild fruit trees and the rest of the forest trees are protected; and ii) the vegetation under the trees are regenerated and soil is protected.

After a slow start in its first years, the project is now performing very well and is having considerable direct impact on the households it is targeting as well as indirect impact on policies, institutions and behavioral standards.

Map 1 : Distribution of Forests and Forestry Regional Directorates in Turkey

(Source : General Directorate of Forestry)

