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People, forests and trees in West and Central Asia

Outlook for 2020

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Foreword

Worldwide, awareness of the social, economic and environmental functions of forests and trees is growing, and efforts to enhance their protective and productive roles are increasing. In West and Central Asia, governments, private sector, communities, farmers and civil society organizations are making substantial efforts to improve the management of forest and tree resources. However, most countries face enormous challenges in this regard and efforts are far from adequate to meet society's needs. Often priorities and strategies fail to take into account the larger changes, in particular developments outside the forest sector and, more importantly, the emerging global and regional issues. Traditionally, most forest planning has tried to focus on domestic issues. However, globalization is necessitating change, compelling countries to look at the broader regional and global picture to develop national policies and programmes.

It is in this context that FAO, in partnership with the countries of West and Central Asia, initiated the Forestry Outlook Study for West and Central Asia (FOWECA) to assess trends and future changes in the forestry situation. The study focuses particularly on probable development scenarios, their implications for societal welfare in terms of the availability of goods and services, and the priorities and strategies that may be pursued to improve the situation. This is one of a series of regional outlook studies that FAO has undertaken in response to requests from the FAO Committee on Forestry and the Regional Forestry Commissions. FOWECA has brought together information from a variety of sources, in particular from the countries of the region, and attempts to provide a comprehensive, regional perspective, which we hope will be of interest to planners, investors and decision-makers at the regional, subregional and national levels.

The process adopted in implementing the study has significantly strengthened the network of forestry professionals. For example, a series of regional and subregional meetings and workshops undertaken for FOWECA has helped to enhance strategic planning capacity and to provide a broader perspective on the development of forestry in the region. It is hoped that FOWECA will help to enhance the ability of countries to improve their national forest programmes. FAO, through the Near East Forestry Commission and in partnership with member countries and other stakeholders, will strive to follow up the recommendations from the study and thus, it is hoped, enhance the contribution to society of forests and trees in the region.

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Acronyms

AAAID	Arab Authority for Agricultural Investment and Development
AOAD	Arab Organization for Agricultural Development
CAREC	Regional Environmental Centre for Central Asia
CBD	Convention on Biological Diversity
CDM	Clean Development Mechanism
CITES	Convention on International Trade in Endangered Species of Wild Fauna and Flora
CSO	civil society organization
EFI	European Forestry Institute
FAO	Food and Agriculture Organization of the United Nations
FOWECA	Forestry Outlook Study for West and Central Asia
FRA	Global Forest Resources Assessment
GCC	Gulf Cooperation Council
GDP	gross domestic product
GEF	Global Environment Facility
IGAD	Intergovernmental Authority on Development
IUCN	World Conservation Union
MDF	medium-density fibreboard
NEFC	Near East Forestry Commission
NEAP	National Environmental Action Plan
NBSAP	National Biodiversity Strategy and Action Plan
NCWCD	National Commission for Wildlife Conservation and Development, Saudi Arabia
NGO	non-governmental organization
NWFP	non-wood forest product
SFF	State Forest Fund
UAE	United Arab Emirates
UN	United Nations
UNDP	United Nations Development Programme
UNECE	United Nations Economic Commission for Europe
UNEP	United Nations Environment Programme
UNCCD	United Nations Convention to Combat Desertification
UNFCC	United Nations Framework Convention on Climate Change
WCMC	World Conservation Monitoring Centre
WRI	World Resources Institute
WWF	Worldwide Fund for Nature

Summary

The Forestry Outlook Study for West and Central Asia (FOWECA) is one of FAO's regional outlook studies undertaken to provide a long-term perspective of changes in the forest sector. It was initiated in 2004 in response to the recommendations of the fifteenth session of the Near East Forestry Commission (NEFC). Implemented in partnership with the countries, this study covers 23 countries in West Asia, Central Asia and the southern Caucasus. It provides an outlook of the forest sector up to the year 2020, outlines the probable developments and discusses what needs to be done to enhance the contribution of forests and trees to societal welfare.

CURRENT STATE OF FORESTS AND FORESTRY IN THE REGION

Forest cover and changes

Low forest cover and low productivity. West and Central Asia is the least forested region in the world: 17 of 23 countries have less than 10 percent of their land area as forests. With the exception of a few countries, the overall environmental conditions in the region are unfavourable to tree growth. The region accounts for about 1.1 percent of the global forest area and about 5.2 percent of other wooded land. Forests and woodlands are also unevenly distributed, with a few countries accounting for most of the forest area.

Planted forests mostly established to fulfil protective functions. Planted forest area in the region is also low, accounting for 11.6 percent of forest area (7.3 percent for Central Asia and the Caucasus and 13.9 percent for West Asia). A few countries account for most of the planted forests. Most have been established to fulfil protective functions.

Stability at a low base. Although the extent of forests and wooded land in the region remained rather unchanged between 1990 and 2005, some countries experienced a marginal increase. However, because forest inventories are either lacking or not undertaken regularly, the information that is available needs to be treated carefully.

Production of wood and non-wood forest products

Increasing dependence on imports. Considering the low growing stock and the region's poor growing conditions, the current production of industrial roundwood and other wood products is very limited; therefore, the region highly depends on imports. The per capita consumption of wood and wood products is substantially lower than that of global consumption, most of which is met through imports. In 2005, the region's imports amounted to about US$12.7 billion. Between 1995 and 2005, imports grew at a rate of 5.7 percent and the trend is likely to persist in the future.

Continued dependence on woodfuel in a number of countries. Although a number of countries are global suppliers of fossil fuels and although woodfuel demand has declined significantly during the past two decades, woodfuel continues to remain an important source of energy for rural people in some countries, as they do not have access to commercial energy supplies. Illegal removal of fuelwood (and the production of charcoal) is widespread and an important cause of degradation of forests and rangelands.

Non-wood forest products important, but information erratic. Non-wood forest products (NWFPs) are an important source of livelihood for the rural population in all the countries of the West and Central Asia region. They range from products used for local consumption to products that are traded internationally. However, insufficient information, especially because of the unorganized nature of collection, processing and trade, makes it difficult to assess their overall contribution.

Environmental issues at the forefront

Forests and woodlands in the West and Central Asia region provide a number of environmental services, in particular the protection of watersheds and arresting land degradation and desertification. In many countries, not only is there increasing emphasis on the recreational and amenity functions that forests and woodlands can provide, but substantial investments are also being made to establish and manage urban and peri-urban forests. Environmental services are increasingly becoming more important than the productive functions of forests for many of the countries, and the upward trend in the demand for environmental services is expected to persist, especially as society's willingness and ability to meet the costs of provision of such services improve.

Growing interest in biodiversity conservation. Around 2.9 percent of the region's land is in protected areas (IUCN categories I to IV), and some countries have made impressive efforts to protect unique ecosystems and save endangered species, including through capture breeding. However, in general, the overall state of management of protected areas requires substantial improvement. Loss of habitat through agricultural expansion and hunting is the main factor contributing to the declining wildlife in many countries of the region.

Land degradation and desertification remain the most critical problems. Both extreme climatic conditions as well as poor management of agriculture and rangelands make the region highly vulnerable to land degradation and desertification. Some Central Asian countries have particularly suffered from the degradation triggered by the diversion of water for large-scale irrigation. In addition, controlling toxic salt deposition has also proven to be costly.

Upland degradation exacerbating water deficit. The entire region suffers from high levels of water deficit, exacerbated by the severe degradation of catchments.

M. UEMOTO

Water deficit implies a need for careful choice of techniques in afforestation and other environmental planting: irrigated peri-urban planting, Turkmenistan

The problem is particularly complex with some of the shared watersheds. The water deficit implies the need for careful choice of techniques used in afforestation projects and other environmental planting – especially in the selection of species and in management practices – to minimize water demand. Because of the region's limited area of forests and woodlands, addressing watershed degradation requires an integrated approach.

Ecotourism – an emerging potential. Forest-based ecotourism has become an important environmental service and is gaining prominence in many countries. Rising incomes have rapidly increased tourism. In view of institutional constraints, however, such growth has also led to degradation of woodlands in some countries in the region.

Urban forestry receiving considerable attention. As the pace of urbanization accelerates, many countries are paying increasing attention to urban forestry. Green zones, for example, have been developed in and around the important urban centres. There are situations, however, where existing forests, including planted forests, have been cleared for urban expansion and the construction of roads and other infrastructure.

WHAT IS THE FUTURE FOR FORESTS AND FORESTRY?

The future of forests and woodlands and the flow of goods and services will depend on the collective impact of various driving forces and how key players, especially governments, respond to emerging opportunities and challenges.

Drivers of change

Demographic changes to have major impact. While some of the countries in Central Asia and the Caucasus are projected to have low population growth rates, the region overall will experience an annual growth rate of 2 percent between 2005 and 2020, increasing the population from 361 million in 2005 to about 487 million in 2020. Two other critical demographic changes will be continued urbanization (especially in West Asia where about 78 percent of the population will live in urban areas by 2020) and the high proportion of the working age population, which will have a significant impact on the economic and social situation.

Continued economic growth, although uneven and dependent on fossil fuel production, processing and trade. Much of the economic vibrancy of the region depends on the rapid growth of incomes from the exploitation of oil and natural gas. The primacy of oil as the most important source of energy is unlikely to be affected in the foreseeable future, helping to sustain the high economic growth rates of the oil producing countries. Some countries, however, will not have the same opportunities and their economies will likely remain precarious. In the absence of opportunities for economic diversification (except through migration for employment in the better-off countries), dependence on land – through agriculture and animal husbandry – is likely to persist.

Uneven progress in policy and institutional reforms. While most countries are making efforts to improve policy and institutional frameworks, overall progress is still uneven. The next 15 years will continue to witness changes on these two fronts, which will alter the investment climate and the choices available to the various players. With the exception of a few countries, the prominent player in the forest sector is the government. However, most forestry organizations are confronting institutional inadequacies stemming mostly from insufficient human and financial resources.

Conflicts and instability undermining economic and institutional development. Being the critical source of fossil fuel supply to the world, the West and Central Asia region is at centre stage of global geopolitics, and the competition to control energy supplies remains the major factor for instability in the region. Political, institutional and economic fallouts from conflicts and instability are affecting the forest sector directly and indirectly. Wars and conflicts have severely affected the forest situation in a number of countries, especially because large tracts of forests are located in conflict zones making management infeasible.

Probable scenarios

What will happen to the forest sector in the next 15 years will largely depend on the collective impact of the developments in the economic, policy and institutional fronts. At least three broad scenarios can be visualized with differing consequences for the forest sector. They are:

Scenario 1: Struggling to achieve development. Some countries will continue to have poorly developed economies and weak institutions. This is particularly true for countries that lack natural capital and where investments for building up human capital are limited. Poor economic situation and weakly developed institutions result in a mutually reinforcing vicious cycle. Countries under this scenario will continue to face serious difficulties in mobilizing resources for improving the forestry sector.

Scenario 2: Unbalanced development. A number of countries in the region are experiencing rapid economic growth, which is due, and dependent upon, the extraction and processing of fossil fuels. However, this has often produced imbalances in the economy, undermining the development of other sectors, including forestry. Even though the availability of financial resources is not a major problem, forestry remains marginalized because of institutional weaknesses.

Scenario 3: Balanced development. Only a few countries are making adequate efforts to diversify their economic base and build up pluralistic institutions. Economic growth is even, and broad-based institutional development has enabled more people to participate in economic activities. Economic and institutional vibrancy enables countries under this scenario to take advantage of the opportunities provided by globalization.

Regional forest situation dependent on the prevailing scenarios. The proportion of countries under the three scenarios will change over the next 15 years. While for some the situation may improve (or deteriorate if adequate attention is not paid to manage the economic and political challenges), others will continue to remain in their current state of economic and institutional development. The overall situation of forests and forestry in the next 15 years will thus depend on the changes in the proportion of countries under the different scenarios.

Probable state of forests and forestry

Forest cover likely to stabilize and increase in many countries. The extent of forests and woodlands is expected to increase in most countries, largely because of the declining importance of agriculture (including animal husbandry) as the main source of income and employment. Increasing urbanization and the development of the manufacturing and services sectors could help to reverse agriculture expansion. There will also be some increase in afforestation and reforestation compensating the loss of forests, although not the loss of biodiversity. Most afforestation efforts will focus on environmental improvements – establishing shelterbelts and windbreaks and creating urban green spaces.

Degradation to remain a major problem in several countries. Degradation will remain a major problem that several countries will have to confront. In the countries where substantial forest cover exists, an increase in timber exploitation – both legal and illegal – could be anticipated.

Sustainable forest management still out of reach. Although some countries may be able to increase their forest cover, the ability of most countries to implement sustainable forest management will remain limited. This will require substantial efforts on the policy and institutional fronts. Moreover, problems such as forest fires are expected to worsen.

Most demand for wood and wood products to be met through imports. The growth in population, the increases in income and the changes in lifestyles, especially due to urbanization, will increase wood product consumption. During the next 15 years, consumption is expected to grow at an average annual rate of 3 to 4 percent for sawnwood and 4 to 5 percent for wood-based panels and paper and paperboard. Faster growth (in relative terms) is expected in Central Asia, whose economies are on the path of recovery. The value of forest products imports is likely to double in the next 15 years (from the 2005 level of US$12.7 billion), and the region will remain the most important net importer of wood and wood products.

Growth in wood industry based on imported raw material. The scope for enhancing industrial wood supplies from within the region is extremely limited and most of the demand will continue to be met through imports from outside the region. Some of the countries that are strategically located and have a large domestic market (for example, the Islamic Republic of Iran and Turkey) will be in a better position to develop forest industries based on imported industrial roundwood. The declining profitability of Europe's wood industry could further speed up the relocation of industries to West and Central Asian countries that have low labour costs, stable investment climate and access to wood supplies from within and outside the region.

Increased demand for environmental services. Considering that most countries are experiencing a general upward trend in incomes, an increase in the demand for environmental services is inevitable. Improvements in transport (e.g. the revival of the Great Silk Road) and communications, together with political stability and improved security, are expected to boost internal and international tourism in the region. The recreational value of forests and woodlands will continue to increase rapidly in the coming years, requiring substantial efforts in their management in order to prevent degradation. A major shift will be necessary in the objectives and approaches to resource management within the context of the growing importance of forest-based recreation.

Increased investments in urban forestry. Urban forestry is another area that will witness substantial expansion as some countries begin to diversify their economic base by expanding banking, trade, tourism and other service sectors. However, forests and woodlands close to urban areas will be subjected to intense pressures for conversion and for recreation.

Arresting desertification to remain a key concern. The demand for protecting agricultural land and habitations from desertification and land degradation will also increase, requiring higher investments for establishing shelterbelts and windbreaks. Much of this will, however, depend on the ability of the key players, namely governments and farmers, to make such investments.

WHAT NEEDS TO BE DONE TO IMPROVE THE SITUATION?

Undoubtedly, the priorities and strategies will differ among the countries depending on the current and emerging economic and institutional scenarios. Yet the broad similarities of the environmental and socio-economic conditions make it possible to identify some common priorities and strategies. As the overall economic and institutional environment transforms, so will the demand for forest products and services and society's ability to meet the demands.

Common priorities and strategies

Provision of environmental services to remain the primary objective. Considering the environmental situation of the region – the arid and semi-arid conditions, the high level of desertification, declining agricultural and rangeland productivity because of land degradation, loss of biodiversity, increasing water stress – the provision of environmental services will be the most important concern for almost all countries. The use of forests for recreation through ecotourism is another growth area.

Policies that enable integrated resource management. Enhanced provision of environmental services and production of wood and other products require policies and strategies that cut across sectoral barriers and that adopt a landscape approach. This could imply that forestry may not exist as a distinct sector, but forestry concerns are integrated with those related to other land uses, especially agriculture and range management. Traditionally, forest policies have largely focused on areas that are controlled by public-sector forestry agencies (State Forest Funds as in the case of many former Soviet Republics). Integrated land use would involve going beyond the traditional domain of foresters, requiring more broad-based approaches and the attendant skills.

Institutional reinvention unavoidable. The formulation and implementation of policies for integrated land management requires that countries have more broad-based institutions. Revamping public-sector forestry agencies, which currently play a dominant role, will require a re-examination of their core values, functions and structures and making appropriate changes. The increasing role of the private sector, community groups and civil society organizations provides new opportunities for the production of forest products and environmental services. In some cases, this would require substantially reinventing existing institutions.

Realizing the full potential of intercountry collaboration. Ecological contiguity of countries in the region (especially through shared watersheds) underscores the importance and potential for intercountry collaboration. The sharing of information and technology and

undertaking joint initiatives are important to reduce costs and to enhance the effectiveness of resource management initiatives. Subregional and regional collaboration is particularly relevant in addressing problems such as fire and pest and disease outbreaks. Management of transboundary protected areas is another activity where intercountry collaboration is particularly important, or even a necessity. Resource assessment, education, research and training are other areas that could significantly benefit (especially by way of reducing costs) from subregional and regional collaboration.

Scenario-specific strategies

Differences in the current and emerging economic and institutional environment necessitates that countries fine-tune their priorities and strategies to make them relevant to the specific scenarios.

Struggling to achieve development: build up from the base. Under the scenario of "struggling to achieve development", institutional and economic constraints will necessitate that countries adopt a strategy of "build up from the base". This particularly focuses on using less resource-demanding options, largely relying on local institutions. Interventions should thus emphasize:

- meeting people's basic needs sustainably;
- building up local institutional capacity;
- improving and adapting local-level technologies and upgrading skills;
- focusing on less resource-demanding investment options.

Institutional development a priority under the "unbalanced development" scenario. Although the resource situation is less precarious under this scenario, the rapid growth of a dominant sector (one that generates most of the economic surpluses) undermines the economic viability of most other traditional sectors. A major problem is that while production aspects of forests and forestry are unlikely to get much political attention, they are also less economically viable, especially in view of low productivity and the high real costs of inputs such as water. The overall approach of "improve fundamentals and change direction" involves the following components:

- encouraging pluralistic institutional arrangements;
- improving the role of public-sector agencies as facilitator to support the development of other institutions;
- upgrading technologies and skills.

Ensuring sustainability of "balanced development". While countries under the "balanced development" scenario are better off economically and institutionally, they need to be vigilant to sustain their advantages. Operating in a highly globalized situation requires continuous adaptation to internal and external changes. Strong external linkages increase competition in both domestic and external markets and this would necessitate continuous scaling up of the quality of products and services provided. Much of the thrust will be to:

- maintain vibrancy of institutions and their adaptability;
- invest in human skills to improve efficiency and competitiveness;
- focus on unique and high-value products and services.

NEXT STEPS

No doubt the region will witness significant political, economic, social and environmental changes in the next 15 years, especially as countries address the different challenges and become more integrated into the world economy. The broad priorities and strategies outlined above need to be elaborated and adapted to the specific situation of each country. Improvements in national forest programmes should particularly focus on institutional adaptation and reinvention, especially through integrated resource management, strengthening the strategic planning capacity and improving the information base.

Q. MA

Rangeland in Oman

1. Introduction

BACKGROUND

Most countries in the West and Central Asia region (see Map) have low forest cover, and the overall environmental conditions – especially extreme aridity and water scarcity – are unfavourable to tree growth. Consequently, the direct economic contribution of forests and trees through the production of wood and wood products (including income generation and employment) is very low for many of the countries. The harsh environmental conditions, however, underscore the need to pay greater attention to the protective functions of forests. Land degradation, desertification, water scarcity and loss of biodiversity are the more serious problems, and increasing efforts are being made to address these issues with forests and trees playing an important role. With urbanization, there is also an increased awareness of the amenity value of trees, and many countries are now furthering the development of green spaces to enhance the quality of urban life.

While almost all countries have ongoing programmes that support forests and forestry, the level of efforts differs depending on the nature of the problems and the ability of the different stakeholders to address them. Although what happens to forests and forestry will be greatly determined by what happens outside the sector, intersectoral issues are inadequately taken into account in the planning process. With the increasing pace of globalization, it is also clear that planning in the forest sector needs to take into account the larger regional and global situation. Understanding the emerging issues and assessing changes in this broader context of the changing society-forest relationship are critical to identifying the priorities and strategies and to ensuring that available resources are used more efficiently.

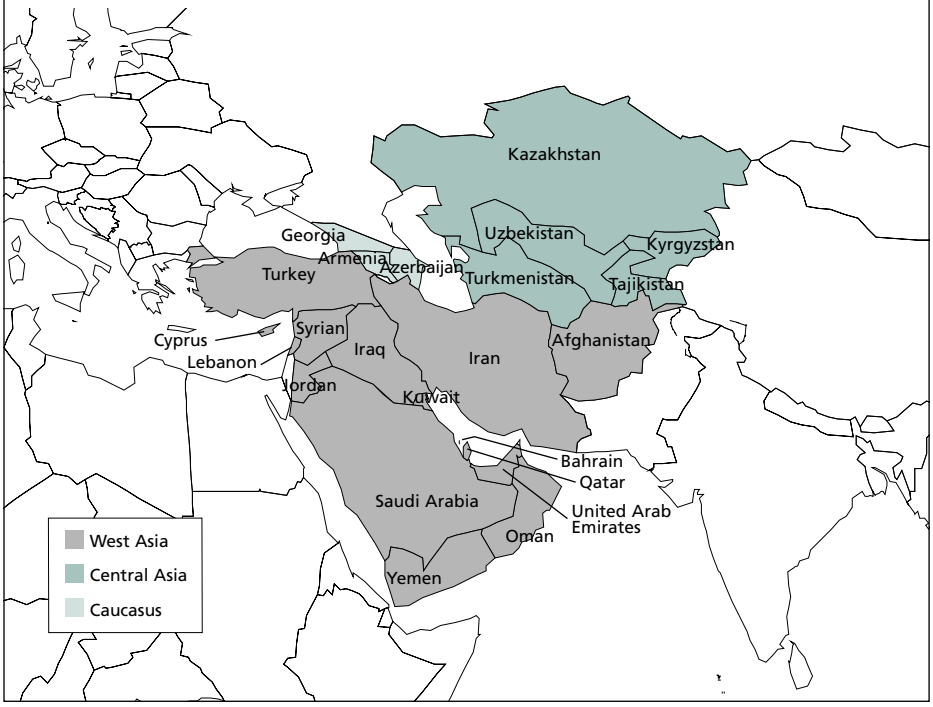
It is in this context that FAO initiated the Forestry Outlook Study for West and Central Asia in response to the recommendation of the fifteenth session of the Near East Forestry Commission. This outlook study covers 23 countries in Central Asia, the southern Caucasus and West Asia (Figure 1.1).

OBJECTIVES AND OUTPUTS

The primary objectives of FOWECA are to:

- provide a long-term perspective (using 2020 as the reference year) of the development of the forest sector, taking into account the overall economic, social, institutional and technological changes;
- improve country capacity in strategic planning in the forest sector by providing a broader perspective of developments at the regional and global levels;

FIGURE 1.1
Countries covered in the Forestry Outlook Study for West and Central Asia



- facilitate exchange of information and regional collaboration through networking.

FOWECA analyses the trends and driving forces that will shape the sector to 2020. Based on this analysis, the study identifies the policy, programme and investment options that can enhance the sector's contribution to sustainable development. FOWECA is designed to complement other forest-related strategic planning initiatives in the countries, especially national forest programmes. The study is particularly intended to provide answers to some key questions relating to the future of the region's forests and trees (see Box 1.1).

Adhering to the concept of broad-based participation, FOWECA followed a consultative process as it undertook the study. Every effort was made to fully involve the countries and the experts on the subject. Box 1.2 provides a brief account of the process adopted in implementing the study.

The main outputs of FOWECA are two subregional reports and a regional outlook report. The regional report examines the regionwide situation and outlook, and provides an indication of where the region's forestry stands in the global context. The subregional reports on the other hand provide an in-depth analysis of current and emerging issues taking into account the economic, social, environmental, and policy and institutional situation in the two subregions – Central Asia and the Caucasus, and West Asia.

BOX 1.1
FOWECA questions

- What roles are forests and trees expected to play in the region?
- What changes are foreseen in the next 15 years in forest resources?
- How should the forest sector respond to such changes?
- How are the demands for forest goods and services likely to change in the next 15 years?
- What are the options available to improve the forest situation in the region?

BOX 1.2
FOWECA implementation process

FOWECA was implemented as a consultative process involving key stakeholders, especially the countries in the region. Of the 23 countries, 20 nominated focal points to coordinate the provision of country inputs. Working groups established at the country level analysed developments in the sector involving as many stakeholders as possible. Discussions and analyses at the country level led to the preparation of country outlook papers. During the process, FAO assisted the countries in their analyses through regular communication, country visits and a series of workshops. The focal points participated in the subregional workshops held in their respective regions, initially for planning the study and subsequently to review the draft country reports. These subregional workshops helped to enhance interaction between the country focal points and to build up an informal network enabling exchange of information.

In addition to the country outlook papers, FAO also commissioned a series of reports and studies on thematic issues. These addressed some key issues in the region's forest sector, including policy and institutional changes and land-use dynamics; urban and peri-urban forestry; watershed management; environmental aspects of forests and trees; wood energy; forestry and poverty alleviation; wildlife management; and wood consumption trends. These provided focused analyses on a number of cross-cutting issues of broader relevance to most countries in the region.

Based on the information from the country outlook papers, the thematic studies and information from several other sources (including those collected by FAO staff during visits to the countries), a draft regional report was prepared and presented for discussion during the FOWECA regional workshop, primarily of national focal points, held in Istanbul in December 2005. A revised report that incorporated the various suggestions from Istanbul was presented to the Near East Forestry Commission (NEFC) during its seventeenth session held at Larnaca, Cyprus, in June 2006. This report takes into account the various suggestions received during the seventeenth session of the NEFC.

STRUCTURE OF THE REPORT

Chapter 2 provides an overview of forests and woodlands, including their management and the policy and institutional framework. The benefits of forests to society, including their productive and protective values and the sector's contribution to income and employment, are examined in Chapter 3. Chapter 4 outlines the factors influencing the forest sector and their implications for the future. Considering the potential effects of various factors, Chapter 5 discusses the probable scenarios on the future of forests and forestry within the next 15 years. The implications of the different scenarios for forestry, especially on the state of resources and the provision of goods and services during the next 15 years, are also discussed in the chapter. Chapter 6 examines the priorities and strategies for the forest sector. Finally, the last chapter summarizes the key findings and recommendations.

2. Current state of forests and forestry

The West and Central Asia region dealt with in this study comprises 23 countries, stretching from Kazakhstan in the north to Yemen in the south, and Afghanistan in the east to Turkey in the west. Although mostly hyper-arid, arid and semi-arid (altogether accounting for more than 75 percent of the land area), the region also has a few areas, in the Islamic Republic of Iran, Georgia and Turkey, with annual rainfall exceeding 2 000 mm. Vast stretches of deserts are found in Central Asia – notably, the Kara Kum and Kyzyl Kum – and the Arabian Peninsula. Vegetation ranges from the mangrove forests on the Gulf coast to alpine meadows in the Central Asian countries. Extensive rangelands form a buffer between agriculture and forest land and absorb some of the pressures of agricultural expansion.

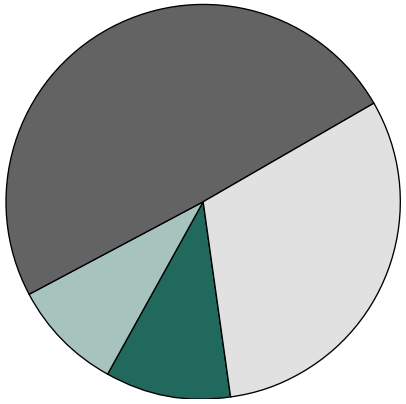
Regardless of the geographical contiguity, important economic, social, political, institutional and environmental differences exist among the countries and are mirrored in the forestry situation. Although generalizing is difficult, there are some common threads that suggest opportunities to learn from each other's experience and to pursue joint action to address some of the key problems. Ecological contiguity of the region, reinforced by shared watersheds and problems such as desertification, provide opportunities for joint action.

AN OVERVIEW OF LAND USE

Figure 2.1 presents an overview of land use in the West and Central Asia region (see Annex, Table 1 for country area details). Although the region's total land area is very high, the proportion of arable area is very low, varying from 0.1 percent in Oman to 33.7 percent in Turkey. Overall, the proportion of arable land for the whole region is only 8.9 percent of the land area. Permanent pastures account for nearly 50 percent of the land area.

Clearly, the region's adverse environmental conditions impose severe constraints on land use. Agricultural development is primarily dependent on improving irrigation through exploitation of surface and groundwater. Most of the important river systems have been harnessed to support agricultural development. Given the region's low and unpredictable rainfall, nomadic animal husbandry has been an important source of livelihood as it takes into account the seasonal changes in water and fodder availability. The rangelands occupy the transition zone between the cropped area and the woodlands and forests. In most countries, agricultural expansion has largely been achieved by converting rangelands and developing irrigation infrastructure.

FIGURE 2.1
Overview of land use in West and Central Asia



Forest and other wooded land	114 806	(10.5%)
Arable land	98 253	(8.9%)
Permanent pasture	543 865	(49.5%)
Other land	341 444	(31.1%)

The region's unfavourable climatic and soil conditions greatly influence forests and woodlands, including their composition and productivity. The uses of forests and woodlands differ significantly because of the differences in human pressures and, more importantly, the key actors' ability to invest in and manage the resources.

EXTENT OF FORESTS AND WOODLANDS AND IMPORTANT CHARACTERISTICS

Figure 2.2 shows the extent of forests and woodlands in the region,[1] with their overall distribution summarized in Table 2.1 (for country details, see Table 2 in the Annex).

The West and Central Asia region is estimated to have around 1.1 percent of global forest cover and around 5.2 percent of other wooded land. Together, the region accounts for about 2.2 percent of the global forest area and other wooded land (Figure 2.3). The region's territory accounts for about 8.2 percent of the world total.

---

[1] The Global Forest Resources Assessment 2005 (FRA 2005) uses the following definitions for "forest" and "other wooded land" (FAO, 2004):
Forest: Land spanning more than 0.5 hectares, with trees higher than 5 metres and a canopy cover of more than 10 percent or trees able to reach those thresholds *in situ*. It does not include land that is predominantly under agricultural or urban land use.
Other wooded land: Land not classified as forest, spanning more than 0.5 hectares, with trees higher than 5 metres and a canopy cover 5 to 10 percent, or trees able to reach these thresholds *in situ*; or with a combined cover of shrubs, bushes and trees above 10 percent. It does not include land that is predominantly under agricultural or urban land use.
For further explanation on the definitions, see: www.fao.org/forestry/site/13637

FIGURE 2.2
Forests and other wooded land in West and Central Asia

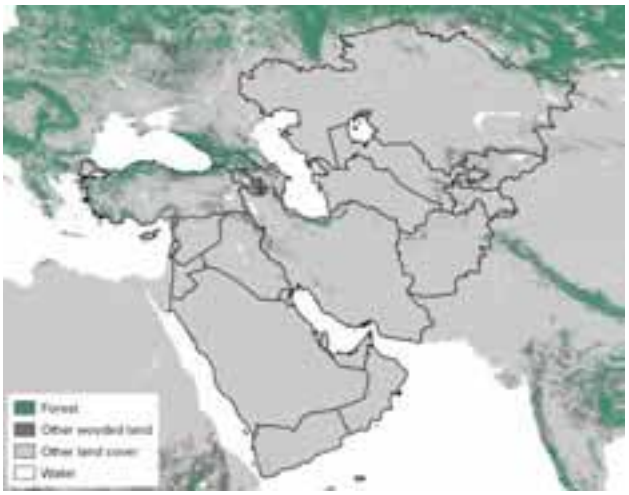
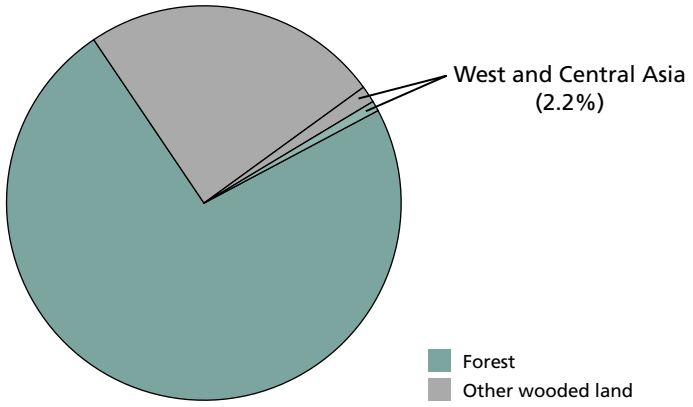


TABLE 2.1
Extent of forests and other wooded land, 2005

Region/subregion	Forests		Other wooded land		Land area
	Area *(million ha)*	% of land area	Area *(million ha)*	% of land area	
Central Asia and Caucasus	16.02	3.8	17.13	4.1	418.90
West Asia	27.39	4.0	54.23	8.0	681.07
Total West and Central Asia	**43.40**	**3.9**	**71.36**	**6.5**	**1 099.97**
Total world	**3 952.02**	**30.3**	**1 375.83**	**10.3**	**13 418.52**

Source: FAO, 2006a.

FIGURE 2.3
The region's share of the world's forests and other wooded land



Central Asia and the Caucasus

Forest cover. Forest cover comprises just about 3.8 percent of the land area in Central Asia and the Caucasus subregion, and even after including other wooded land accounts for about 8 percent of the land area. With some 40 percent of the land under forests, Georgia is the most forested country in the entire West and Central Asia region. Although Kazakhstan has the lowest proportion of land under forests (1.2 percent), it has more than 3.3 million hectares of forests. If discrepancies in classification are taken into account and an area of about 15.6 million hectares of other wooded land mainly comprising saxaul (*Haloxylon* spp.) forests is included, Kazakhstan's forest cover increases to about 7 percent of the land area.[2]

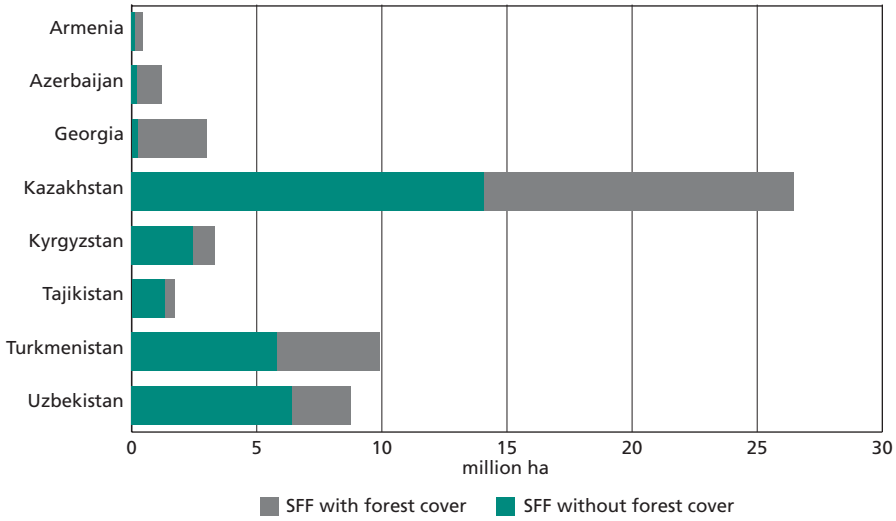
The overlap between ownership and ecological groupings is a major cause of discrepancy in forest area statistics of the Central Asia and Caucasus countries. Since the Soviet period, all Central Asia and Caucasus countries have been using the land classification "State Forest Fund" (SFF). Invariably, the area under SFF exceeds what is reported as forest cover (see Figure 2.4). In addition, the proportion of land covered by forests in the SFF varies considerably among the countries, from about 24 percent in Tajikistan to 92 percent in Georgia. Lands classified as State Forest Fund are not always used for forestry despite the intention at the time of such groupings. Often these lands are allocated to agricultural enterprises for cultivation and grazing (see Box 2.1).

Composition. The region has considerable variation in species composition and other characteristics of the forest, reflecting the differences in climate and topography. In the Caucasus, the dominant vegetation consists of broadleaves, especially oaks, beeches and hornbeans, which make up 80 percent of the forests. A limited number of conifers grow, which include pines, firs and spruces. Relatively few broad-leafed species grow in Central Asia. Saxaul (*Haloxylon* spp.) and other bushes are commonly found in deserts and semi-desert areas of Kazakhstan, Turkmenistan and Uzbekistan. In Kazakhstan and Kyrgyzstan (the mountainous areas of Tien Shan), thickets of trees such as birch, firs and aspens grow in the northern and eastern parts. Flood plain "tugai" forests are found in the drylands of Central Asia and in small areas of Azerbaijan.

Growing stock. The differences in the species composition and growing conditions are reflected in the growing stock and increment (see Annex, Table 3). Forests in

[2] The national data provided from Turkmenistan for FRA 2005 indicate that the dominant species in the area classified as forests is saxaul (*Haloxylon* spp.), and furthermore the growing stock per hectare is very low. This indicates that part of the area classified as forest may actually be other wooded land according to the FRA 2005 definition. Similarly, for Uzbekistan large inconsistencies in the national classification of original data provided for FRA 2005 for the period 1990 to 2004 prevent reclassification based on the FRA 2005 definition. A decline in forest area in Azerbaijan was reported without detailed information, and therefore the same area figure was used for all the periods (see www.fao.org/forestry/fra).

FIGURE 2.4
Forest cover of State Forest Fund lands in countries of Central Asia and the Caucasus



BOX 2.1
State Forest Fund for pasture use in Tajikistan

By governmental decision, 1.08 million hectares, or more than 60 percent of Tajikistan's State Forest Fund, are allocated for long-term use as pasturelands to agricultural enterprises. These areas are rich in forest and grass vegetation and were traditionally used as distant pasturelands in past decades. Although overgrazing and degradation of grass and forest vegetation have been observed in these areas, particular measures have not been taken for conservation and/or restoration of degraded vegetation. The remaining 40 percent of the State Forest Fund of 642 000 hectares is of little use for forest development. The land is not suitable for afforestation and it is difficult or even impossible to grow trees.

Source: FAO, 2006a.

the Caucasus and Kazakhstan have relatively high growing stock, varying from 109 m^3 per hectare in Kazakhstan to about 167 m^3 per hectare in Georgia. In contrast, the growing stock is low in the remaining four Central Asian countries, ranging from about 4 m^3 hectares in Turkmenistan to 34 m^3 per hectare in Kyrgyzstan. It must, however, be borne in mind that these figures are based on inventories that were carried out years beforehand. More recent inventories have not been undertaken mostly because of institutional weaknesses, especially since

the break up of the Soviet Union in 1991. Misclassification is another problem that makes intercountry comparisons difficult. For example, low productivity desert woodlands in Turkmenistan and Uzbekistan are counted as forests, while similar areas in Kazakhstan are grouped as wooded land. Such misclassifications have produced large discrepancies in the estimates of growing stock.

West Asia

Forest cover. The total forest cover West Asia is estimated at 27.4 million hectares, or about 4 percent of the land area. The Islamic Republic of Iran, Saudi Arabia and Turkey account for almost 88 percent of the forest cover in the subregion (see Annex, Table 2). Only three countries have more than ten percent of their area under forests: Cyprus with 18.9 percent, Lebanon 13.3 percent and Turkey 13.2 percent. In addition to forests, most of the countries also have a large extent of other wooded land. For example, Saudi Arabia has about 34.2 million hectares of other wooded land, and if this area were included in the estimate, the area under forests would amount to 17 percent of the total land area. Other countries that have significant extent of wooded land are Turkey (10.7 million hectares), Iran (5.3 million hectares), Yemen (1.4 million hectares) and Oman (1.3 million hectares). Several countries also have wooded land exceeding the extent of forests, Cyprus and Iraq, for example.

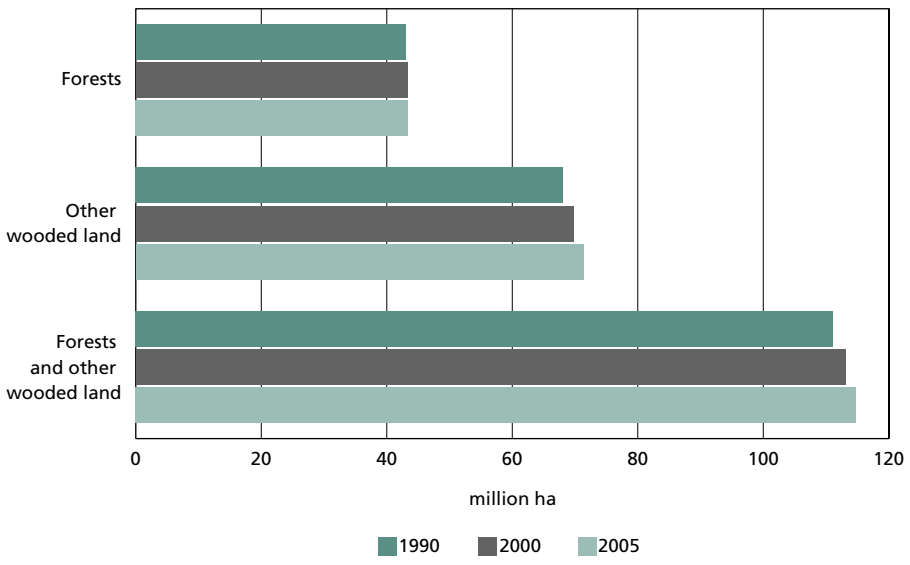
Composition. The predominant species in the West Asia region are pines, oaks and acacias, with patches of mangroves along the Red Sea and Gulf Coast. Hilly areas in the Arabian Peninsula, especially along the Red Sea coast, support woodlands consisting predominantly of junipers. Afforestation receives substantial attention in the region, and the species mostly planted are eucalypts, pines and acacias. Date palm is another highly preferred species for the Arabian Peninsula countries.

Growing stock. Because of the extreme ecological conditions, forest productivity in the subregion is low and, apart from Turkey and certain areas of Iran, timber production potential is extremely limited. The growing stock in Iran is estimated to be about 48 m^3 per hectare, while Turkey's stands at 138 m^3 per hectare and results from the high stock of the Caspian forests. The growing stock in many of the other countries is low, usually below 20 m^3 per hectare, and reflects the unsuitable growing conditions.

FOREST COVER CHANGE

The change in the extent of forest cover and other wooded land for the region between 1990 and 2005 was insignificant (Figure 2.5 and see Annex, Table 4 for the details of changes in each of the countries in the region). Aggregated figures, however, mask the intercountry differences in area change. For example, Armenia's forest cover declined from about 305 000 ha in 2000 to about 283 000 ha in 2005 (see Annex, Table 4). During the same period, Uzbekistan's forest cover registered an increase from 3 212 000 ha to 3 295 000 ha, which was mostly due

FIGURE 2.5
Change in the extent of forests and other wooded land



to classification changes. There were also changes in the extent of other wooded land, with Kazakhstan registering a significant increase of over 800 000 ha between 2000 and 2005 as a result of afforestation. However, caution is needed in interpreting the data and drawing conclusions, especially when recent inventory information is not available.

The forest cover for most of the countries in the West Asia region has been relatively stable, and apart from Afghanistan there has been an upward trend in the area under forests. In addition to afforestation to enhance protective functions, there have been instances of secondary forests recolonizing abandoned agricultural land, as in Cyprus and Lebanon. Turkey accounts for a substantial increase as it increased its forest cover by more than 123 000 ha. In contrast, Afghanistan's forest cover declined by 148 000 ha between 2000 and 2005. Changes also occurred in the extent of other wooded land, with Iraq's wooded land area declining about 106 000 ha. As shown in Annex, Table 4, there are several cases where forest cover remains unchanged, for example in Georgia, Turkmenistan, Iran, Saudi Arabia and Yemen. However, here again, caution is needed in reaching optimistic conclusions, for the following reasons:

- In a number of countries the forest cover is extremely low and leaves little scope for further decline. Because of the low base figures, even a slight increase due to afforestation or reforestation would indicate a significant jump in the percentage growth rates.

- The reliability of information remains a basic problem. As indicated earlier, country capacity for regular monitoring and reporting of changes in forest cover and tree growth is limited. This is especially true for the countries of Central Asia and the Caucasus, where institutional capacity declined after the collapse of the Soviet Union and regular inventories were no longer undertaken. For instance, the most recent inventories for Turkmenistan and Azerbaijan were carried out in 1988 and that for Armenia in 1993.
- Resource assessments, especially using broad groupings based on crown cover, fail to capture degradation processes. In fact, degradation remains the most critical problem, but insufficient efforts have been made to systematically monitor the changes, largely because of limited financial and institutional capacity. Although the causes of degradation vary among countries, illegal collection of woodfuel (including charcoal production) grazing and fire remain the most important causes.

GENERAL TRENDS IN FOREST MANAGEMENT

The overall direction of management is determined largely by ownership of forests, the objectives of management and, most importantly, the technical and financial capacity of the owners. Although most forests are under public ownership, there are some important differences in management that can be partly attributed to the differences in the political histories of the countries. This is particularly important for the Central Asian and Caucasus countries, which had been part of the Soviet Union until 1991.

Central Asia and the Caucasus

Forest management in the subregion is largely based on the Soviet approach, as many concepts and practices that had evolved prior to independence still are followed. The concept of "State Forest Fund" (*Goslesfund* – the land managed by state forest authorities) developed under the Soviet Union has not changed. Generally, forests were centrally managed by the State Committee on Forestry (*Goskomles*). Since the 1930s, field-level management of forests has been undertaken by state forestry enterprises (*leskhozes*), with some forests allocated to collective farms (*kolkhozes*) and state farms (*sovkhozes*).

A forest classification system introduced in 1943 grouped forests into three functional categories (see Table 2.2). Group I forests were primarily designated for environmental protection, and most of the forests in Central Asia were placed under this category. This classification resulted in improved protection and increased investments in afforestation. Forests in the Caucasus were initially subjected to intensive harvesting in view of their better stocking and access, but since the 1970s they have been included in Group I, which bans commercial felling and increases afforestation and reforestation efforts. During the Soviet period, the Central Asia and Caucasus countries were supplied with wood from Siberia and from the central and northern parts of the former Soviet Union. Since the collapse of the Soviet Union, subsidized supplies have stopped. Import of wood from the Russian Federation has become costly in view of the long distance.

TABLE 2.2
Forest classification system of the former Soviet Union

Forest class	Location	Logging restrictions
Group I: State forest nurseries, protective forests. (e.g. shelterbelts and green zones), steppe forests, national parks, state reserves, etc.	Predominant in central and southern regions of the Soviet Union	Clear cutting prohibited, restricted felling (e.g. regeneration felling, silvicultural thinning, selective cutting of overmature trees)
Group II: Forest of sparsely forested areas (forest steppes), forests belonging to collective farms; forests in populated areas	Central regions	Principally clear cutting, but not exceeding annual growth
Group III: All other exploitable forests	Northern regions of the European part, Taiga zone, Siberia, Far East	All kinds of logging permitted

Political and economic changes have influenced forest management in all the countries. For example, although all forests in Tajikistan belonged to the state until 1997, according to a new governmental decision on the reorganization of collective and state farms, some forests within these farms were assigned for long-term use by the farmers. About 50 000 ha, or approximately 12 percent of the State Forest Fund, have been brought under collective farm management.

The new Forest Code of Armenia, which was approved in 2005, envisages long-term leases of forest land to communities and the private sector. SFF privatization is currently under consideration in Georgia. Kyrgyzstan is in the forefront of adopting participatory approaches and in 1998 introduced Collaborative Forest Management. However, the area with community involvement remains very limited. While it may take years before the approach is tested, refined and applied on a large scale, the fact that efforts are being made to involve communities in resource management is a very positive development. Forests in other countries such as Azerbaijan, Turkmenistan and Uzbekistan are largely under public-sector control and there is considerable reservation with adopting participatory approaches, reflecting the overall political environment in these countries. The negative perception of the Soviet period collective management of forests has adversely affected the wider adoption of community initiatives (see Box 2.2).

Current objectives of and approaches to forest management are rooted in the Soviet management system and most of the forests have been earmarked to fulfil the functions of conservation and protection. Commercial logging is prohibited in most of the countries in Central Asia and the Caucasus and forest management is focused on the provision of environmental services, recreation and wildlife management. Substantial efforts are being made to green urban centres and this receives high-level political support in some countries (see section on urban forestry).

West Asia

Notwithstanding the diverse history of the countries in West Asia, most forests in West Asia are also under public ownership, with some exceptions being Lebanon and Cyprus for example. Lebanon's private forests, which account for

BOX 2.2

Collective versus individual forest management in Tajikistan

People in the former Soviet Union republics sometimes have negative sentiments with regard to "collective" management of forests. This tendency is likely to be rooted in the previous experiences during the Soviet era, when many engaged in "collective" farming under kolkhoz/sofkhoz. For example, in Tajikistan, an NGO's support to collective forest management at the village level has turned out to be ineffective because cooperative management is lacking, whereas individual forests seem to be more successful as they promise future benefits and clearly defined ownership. Another attempt revealed that people prefer to plant fruit trees because they provide immediate benefits.

The negative perception of collective management is largely an outcome of the Soviet approach to collectivization, where large extents of forests (especially those producing fruits and walnuts) were managed collectively by villagers. In order to collect usufructs, forests were divided into individual family plots, but management was done jointly. Such joint management existed in Kyrgyzstan, Tajikistan and Uzbekistan. Negative sentiment also results from the state takeover of collectively managed land for protective functions without giving any consideration to local communities.

about 60 percent of the total forest area, are well managed, although government regulations prohibit the removal of timber. In Cyprus, the extent of private forests is reported to be about 40 percent of the total forest area. These forests are primarily enclosures within government forests and are often abandoned agricultural land. Yemen also has a substantial extent of "private" forests, estimated at about 80 percent of the forest land. However, the precise nature of ownership is unclear because of the absence of proper surveys and mapping and, even more important, an effective legal system that protects ownership rights.

Most forests in the region are managed for their multiple functions with protection being an important objective. Management of protected areas or national parks has gained importance in countries such as Cyprus, Iran, Jordan, Lebanon Saudi Arabia and Turkey. Protective and amenity planting – especially as windbreaks and shelterbelts and green spaces in urban areas – is also receiving considerable attention. Pine nut production is a major objective in the management of forests in Lebanon and Turkey. Similarly, much of the tree planting in Saudi Arabia and the United Arab Emirates has been focused on date palm, which is improving the environment while increasing the production of dates.

A number of countries that had earlier depended on their forests for wood production have over time reduced the level of harvesting as the emphasis is now on improving the provision of environmental benefits. For example, annual timber production from Cyprus's production forests (about 43 500 ha) has declined

from about 50 000 m^3 in the 1980s to about 10 000 m^3 in recent years (FOWECA country outlook paper, Cyprus). Currently, one-third of the Troodos forest is managed as a forest park and receives about one million visitors annually. In Iran, the Caspian forests are considered to be commercially important because of their high growing stock and productivity, but environmental considerations have led to scaling down timber production, from 840 000 m^3 in 1993 to about 600 000 m^3 in 2003 (FOWECA country outlook paper, Islamic Republic of Iran).

REFORESTATION AND AFFORESTATION

Table 2.3 provides an overview of the extent of plantations in the West and Central Asia region (for country details, see Annex, Table 5). In 2005 the total area of plantations in the region was estimated to be about 5 million hectares, or about 3.6.percent of global plantations.

Planted forests in the region account for just about 11 percent of the forest cover (7.3 percent for Central Asia and the Caucasus and 13.9 percent for West Asia). These forests, however, are unevenly distributed, with a small number of countries accounting for most of them. For example, Kazakhstan has almost 78 percent of the plantations in Central Asia. In West Asia, Iran and Turkey account for 83 percent of the plantations.

In Central Asia, the majority of plantations have been established for protective functions, while West Asia has established their plantations primarily for production (about 67 percent). Obviously, most production plantations are found in Turkey and Iran, especially in areas with higher wood productivity. Lebanon also has a high proportion of plantations, primarily established for the production of pine nuts (*Pinus pinea*). Uzbekistan implemented a state programme for growing poplars around villages and farms to increase the supply of construction timber, which has now become an important source of wood supply.

The poor information that is available warrants caution in interpreting plantation area estimates. The available data, however, suggest a slow pace of their expansion. Adverse growing conditions and the high costs of establishment and management limit the scope for commercial ventures, and hence efforts to promote private-sector involvement, as in Turkey (see Box 2.3), have not been effective. Almost all planting is undertaken by governments, and the pace is highly dependent on government priorities and budget allocation. Technical and financial constraints limit the scaling up of plantation efforts, even when their importance is recognized.

TABLE 2.3
Area of forest plantations *('000 ha)*

Subregion/region	1990	2000	2005
Central Asia and Caucasus	1 274	1 323	1 193
West Asia	2 938	3 529	3 803
Total West and Central Asia	**4 212**	**4 852**	**4 995**
Total World	**101 284**	**125 525**	**139 466**

Adverse growing conditions, especially aridity, significantly enhance the cost of establishing and managing plantations. For example, all the plantations in the United Arab Emirates that extend over an area of more than 300 000 ha have been established through irrigation, and so have more than half of the areas of plantations in Iraq. A number of countries – Cyprus, Iran, Jordan, Oman, Saudi Arabia and Turkey – have developed and improved irrigation regimes and use treated sewage water for irrigating plantations. Obviously, the high investment requirement arising from the necessity to irrigate the plants is an important constraint in expanding plantation programmes.

BOX 2.3

Private plantations in Turkey

The government of Turkey has been promoting private plantations since the last decade. A total of 47 000 ha of land have been allocated for private plantations. Different incentives, including loans with low interest rates and land at low prices, are provided to increase plantations. Recent policy measures also include incentives to encourage private nurseries. However, the development of private plantations has not picked up because it is viewed as a commercially unattractive investment dependent on government funding.

Source: FOWECA country outlook paper, Turkey.

BOX 2.4

Some trends in reforestation and afforestation efforts in Central Asia and the Caucasus

- In the last decade before independence, the State Forest Fund in Georgia was undertaking reforestation at the rate of about 10 000 ha a year, but since then reforestation has been scaled down drastically and in 2004 the area reforested through NGOs was about 114 ha.
- The annual rate of reforestation/afforestation in Armenia was about 6 000 to 7 000 hectares between the 1960s and the 1980s. Since independence, the rate has declined dramatically, and in 2004 the extent of reforestation was only 644 ha.
- Annual reforestation in Tajikistan during the Soviet period was about 4 500 hectares; currently it amounts to no more than 2 200 ha.
- Although between 1968 and 1988 more than 15 000 field protection forests were established in Turkmenistan, since 1993 forestry activities have not been undertaken as the forestry sector lacks funds. Moreover, after 2000 a self-financing scheme was introduced, but protective measures that do not generate income have been completely neglected.

The improvement of the environment is a major objective in reforestation and afforestation programmes for almost all the countries. In many West Asian countries, degraded natural forests are being reforested not only to improve productivity but also to enhance ecological functions. Sand-dune fixation is another important thrust in most countries of the two subregions. Here again the differences in the political histories of the countries have influenced the pace of efforts. Prior to their independence, most countries in Central Asia and the Caucasus had a well-planned afforestation/reforestation programme with sufficient allocation of funds from state budgets, but once these countries became independent, programmes were scaled down because of insufficient financial, human and technical resources (Box 2.4). Although some countries are making efforts to improve the situation, many are finding it difficult to increase the scale of reforestation and afforestation.

URBAN FORESTRY

As the pace of urbanization accelerates, countries in West and Central Asia are paying increasing attention to urban forestry (Akerlund, 2005). During the Soviet period, city greening, or urban forestry, was well integrated with urban development in most Central Asia and Caucasus countries. Green zones were developed in and around the capitals of all the countries and were managed by the respective municipal authorities or state agencies. However, the economic decline after independence adversely affected the protection and management of the green zones. For example, the Yeravan forest belt in Armenia, which had encompassed an area of more than 1 370 ha, has decreased substantially because of urban expansion.

Recent years have, however, witnessed renewed efforts to improve the urban environment. Especially where governments are facing less resource constraints, urban forestry is receiving substantial attention. Political support for urban greening is strong in a number of countries, in Kazakhastan and Turkmenistan for example (see Box 2.5).

West Asian countries are also giving considerable attention to urban greening. The growth of some cities in West Asia as major centres of international tourism, trade and finance has encouraged greening efforts. Urban and peri-urban forests are playing an important role in protecting habitations from dust storms and improving amenity and recreation. Parks and gardens have been established at high costs to enhance the attractiveness of important urban centres in Bahrain, Kuwait, Oman, Saudi Arabia and the United Arab Emirates (Box 2.6). The extent of green space in Iran has increased from 6 000 ha in 1987 to about 14 000 ha at present. The Syrian Arab Republic also has undertaken a vigorous urban forestry programme, and forest plantations near cities have been transformed into recreation sites.

The management of urban forests and parks is primarily the responsibility of city administration. Urban forestry in most countries requires high investment, primarily because of the need for irrigation. However, the financial commitment

of municipal authorities is not always stable. Cyprus levies special taxes earmarked entirely to finance urban forestry. A number of countries are using wastewater to develop urban green spaces.

As tourism is now a major source of income, improving the urban environment is receiving high priority. In countries where governments (especially municipal administrations) have limited resources, urban forestry is mainly dependent on international support. Other than financing, a significant obstacle for the development and management of urban green spaces is the lack of specific laws

BOX 2.5

Greening of the capitals of Kazakhstan and Turkmenistan

In December 1997, the capital of Kazakhstan was transferred from Almaty to Astana. In 1998, city greening activities were introduced in the new capital, and by 2005 a total of 25 000 ha of green areas had been established by *Zhasyl Aimak* and its former body, a state organization specialized in greenbelt establishment for Astana. The greenbelts are managed by the municipal government and function as windbreaks and recreational spaces for residents. A total of 75 000 ha are expected to be planted by 2015.
Greenbelts around Ashgabat, the capital of Turkmenistan, have also been increasing since the late 1990s. More than 50 million seedlings were planted during the 1998–2004 period under the Greenbelt Programme, including 30 million seedlings planted in some 25 000 ha in and around Ashgabat. *Gok Gushak* (Joint-Stock Forestry Company) establishes an annual forestry plan, produces and sells seedlings and monitors the implementation of afforestation activities in collaboration with the Ministry of Nature Protection.

BOX 2.6

Urban forestry in the United Arab Emirates

The urban environment in all cities of the United Arab Emirates has been greatly enhanced by planting schemes, turning roadsides into gardens and roundabouts into mini-parks. In addition, there are extensive recreation parks where the shade from trees creates a pleasant environment, especially during the summer. In 1974, Abu Dhabi had only one public park, with very little greenery, but today the number of parks has increased to about 40 and they cover an area of more than 300 ha. The expansion of green areas in the United Arab Emirates is in line with the department's goal of extending the greenery cover to 8 percent of Dubai's total urban area. During 2003, another 30 ha were added to Dubai's greenbelt. At present, the planted area amounts to about 3.2 percent of the land area, or 2 200 ha.

Source: UNEP, 2002.

and regulations. There are also situations (e.g. Iran and Saudi Arabia) where urban expansion has adversely affected existing forests and plantations as they have been cleared for constructing roads and buildings.

TREE RESOURCES IN RANGELANDS

As shown in Table 1 of the Annex, there are extensive areas of range- and pasturelands with scattered tree growth in the West and Central Asia region. Rangelands occupy about 50 percent of the total land area in West Asian countries. Very little information is available on the condition of tree growth in these rangelands, but the perception is that the rangelands are deteriorating fast because of the increased pressure for fodder and woodfuel (see Box 2.7). The decline in traditional community management arrangements is an important contributing factor. Nomadic communities, which had owned and used rangelands, had set up management systems that prevented their overuse. However, subsequent government takeovers have undermined such community arrangements, and governments themselves have not been able to develop viable systems of management. Rangelands have thus become free access resources with no one taking responsibility to manage them. Although pastoralists are becoming increasingly dependent on purchased feed, mainly on imported barley and fodder grown under irrigated conditions, the increase in the livestock numbers has led to continued degradation of rangelands. The proportion of the nomadic population has declined because of the various efforts to settle them; increasingly immigrant workers are being hired to manage livestock.

BOX 2.7

Rangelands in West Asia

Rangelands occupy about 50 percent of the total area in West Asia. The vegetation cover is characterized by low tolerance, low plant density and coverage, and low species variability and plant productivity per unit area. Drought, overgrazing, uprooting of woody species for use as fuel, tillage and mismanagement of water resources are the principal causes of rangeland deterioration. It is estimated that about 90 percent of the rangelands are degraded or vulnerable to desertification. More than 30 percent of grazing land in Saudi Arabia is degraded. Deterioration of rangelands has also been reported in several other countries in West Asia.

The grazing intensity in most West Asian countries has more than doubled over the past four decades, mainly as a result of subsidized feeding, provision of water points and mechanization. Sheep density on some rangelands is more than one mature head per hectare – some four times the natural carrying capacity. It is estimated that the grazing capacity in the rangelands of the West Bank is exceeded by a factor of 5.7.

Source: UNEP, 2002.

Differing trends are seen in Central Asia and Caucasus countries and no definitive conclusions can be drawn because of poor data availability. With the collapse of Soviet Union, many of the large livestock collectives in Central Asia that supplied dairy products to other parts of the Soviet Union also collapsed, reducing the livestock population maintained in the collectives in some of the countries. There are also instances where livestock numbers have increased, adversely affecting certain areas, particularly those with high population densities where people maintain large herds for economic and social reasons. Overgrazing in these areas is a major cause of rangeland degradation.

WILDLIFE MANAGEMENT

Wildlife is another important natural resource in the region, but so far the resource has been used unsustainably in many of the countries (Czudek, 2005). Socio-economic problems in the Central Asian and Caucasus countries during the post-independence period have particularly undermined protection and management. The decline in wildlife is mainly due to two factors: increased hunting and the loss of habitat due to agricultural expansion. The main effort to improve the situation has been the establishment of protected areas. The region has about 3 percent of the land designated as protected areas and the current state of management of wildlife varies considerably.

Countries in the Central Asia and the Caucasus inherited the system of protected area management from the Soviet period. A large increase in the number and extent of protected areas in the region took place in the 1960s and up to the disintegration of the Soviet Union, except for Tajikistan where more than 60 percent of the country's protected areas was established in 1992. This enabled the conservation of a number of threatened species (such as the Persian gazelle, Markhor, Bukhara deer and the snow leopard) and ecosystems. The prevailing model for protected areas in many of these countries is the centrally controlled strict nature reserves (*zapovedniks*).

With the break up of the Soviet Union in 1991, the financial mechanism that supported the nature reserves and national parks collapsed. The collapse of the Soviet system also exposed the weakness in its approach of excluding local people from conservation efforts. Economic decline has particularly given nature protection a low priority. Threatened and endangered species that were strictly protected prior to 1991 are now being subjected to illegal exploitation. Trophy hunting has also increased, but weak regulations and institutional capacity to enforce rules limit the potential benefits – neither local communities are benefiting nor are conservation standards improving (see Box 2.8).

Countries in West Asia are making substantial efforts to protect and manage wildlife, especially by establishing a system of protected areas. Concerted efforts, through institutional arrangements with substantial support from various political levels, have helped to enhance the population of important species whose numbers had declined drastically due to hunting. For example, in Saudi Arabia, the National Commission for Wildlife Conservation and Development (NCWCD), established

in 1986, is responsible for managing most protected areas. The NCWCD is assisted by its two prominent research centres: the King Khalid Wildlife Research Centre and the National Wildlife Research Centre. The reintroduction of the Arabian Oryx, Sand Gazelle and Houbara Bustard are notable successes of the NCWCD. In some cases, non-governmental organizations (NGOs) are spearheading conservation efforts (see Box 2.9).

Following the ratification of the Convention on Biological Diversity, most countries have prepared National Environmental Action Plans (NEAPs) or National Biodiversity Strategy and Action Plans (NBSAPs). Although priorities may differ between countries, most of these programmes and plans adopt a common framework with considerable emphasis on awareness generation, assessment of the status of biodiversity and improvement of institutional capacity. In most cases, such initiatives are undertaken with financial and technical support from bilateral and multilateral organizations and international NGOs. Without external assistance many countries would have found it difficult to formulate national strategies and action plans. However, there is concern about the sustainability of these initiatives, especially because of resource constraints in translating strategies and plans into action. Implementation failures are also due to their inappropriateness to the local economic, social and political conditions.

In addition to participating in the global conventions, some of the countries are also signatories to regional and subregional strategies and priorities. Accessing external resources and enhancing collaboration, especially to address transboundary issues, are some of the objectives of the regional and global initiatives. The

Box 2.8
Trophy hunting in Central Asia

A recent study by TRAFFIC, a wildlife trade-monitoring network (Hofer, 2002), reveals that hunting tourism in Central Asia is evolving. Increasing numbers of foreign sport hunters hunt in the Central Asia region since the collapse of state-regulated markets, but little information exists about the level of reinvestment of these funds in conservation and local development. It has often been reported that few of the funds generated by foreign trophy hunting are actually spent on the conservation schemes for which they were intended. According to the author of the TRAFFIC study "Foreigners hunting highly prized and rare species such as wild sheep and goats present a potential source of foreign exchange income to remote and poor regions in Eurasia. Insufficient documentation reduces trophy hunting's potential benefits for conservation and to regional sustainable development. Without a clear understanding, motivation for law enforcement staff and incentives for enhancement of wildlife management systems remains limited" (Hofer, 2002).

Source: Czudek, 2005.

BOX 2.9

The Royal Society for the Conservation of Nature, Jordan

The Royal Society for the Conservation of Nature is an independent voluntary organization established in 1966 with the mission of protecting and managing Jordan's natural resources. The Society has been instrumental in establishing protected areas, captive breeding of endangered species and setting up nature conservation clubs in schools helping to enhance awareness about environmental conservation.

Source: Royal Society for the Conservation of Nature, Jordan, 2005.

dependence of these initiatives on external support is a major concern for their sustainability. No doubt biodiversity conservation is recognized as important, but in the context of overall resource constraints governments are unable to allocate adequate resources to improve management.

POLICY, LEGAL AND INSTITUTIONAL FRAMEWORK

Although most forests are publicly owned and managed, there are differences in policy and the legal and institutional frameworks, largely reflecting the differences in the political history of the countries.

Central Asia and the Caucasus

All the countries in Central Asia and the Caucasus have developed appropriate legal frameworks for forests after their independence. The basic laws are either the Forest Code or the Law on Forests. Some of the early legislation has already been revised (Armenia, Kazakhstan and Kyrgyzstan); are currently in the process of being revised (Georgia and Turkmenistan); or are in the pipeline for revision (Uzbekistan, for example, is establishing a new code). However, poor implementation of policies and legislation remains the fundamental problem, which largely stems from weak institutional capacity.

As most forests in the subregion are publicly owned, the government is the key actor influencing forest management, and what happens is largely determined by its overall ability to formulate and implement the various policies. Management is still largely centralized, with institutions such as *leskhozes* (state forestry enterprises) having responsibility for implementing management plans. However, they face severe financial and technical problems and are yet to adapt to larger economy-wide changes. Since independence, most countries have attempted to restructure the state forest administration or the former State Committee on Forestry. Broadly, the institutional changes in forestry involve:

- integration of the functioning of the State Committee of Forestry in the relevant ministry (ministry of environment or ministry of agriculture);

- restructuring of the State Committee on Forestry as autonomous or semi-autonomous bodies responsible for all forestry activities (for example, Gok Gushak in Turkmenistan).

Frequent reorganizations, particularly changes of the controlling ministry, have created instability and in many cases the benefits have not been commensurate with the costs (see Box 2.10). The control of forestry agencies has shifted from agriculture to the environment ministry and back, causing instability and uncertainty in their functioning. Often these types of reorganizations also involve changes in leadership resulting in programme discontinuities and loss of institutional memory, thus weakening the overall technical and managerial capability. Another key institutional issue is that policy and management functions are not separated. Most forestry agencies continue to be responsible for both, and this has often led to conflicts of interests. Moreover, activities that generate income in the short term (including exploitation of wood and the use of state forest funds for agriculture) are given priority over conservation and rehabilitation.

The fragmented management responsibility between different agencies is another major problem in some of the countries. For example, in Tajikistan the Agency of Forestry and Hunting Facilities is responsible for forest management, while the State Directorate of Protected Areas "Tajik National Park", under the same committee, is responsible for the management of protected areas. In Uzbekistan, protected areas are managed by several agencies – the main Forestry Department is responsible for several strict nature reserves and Zaamin National Park; the State Committee on Nature Protection for one reserve, an ecocentre and *zakazniks*; the local administration for several reserves, *zakazniks* and Ugan-Chatkal National Park; and the Committee of Geology for one nature reserve.

BOX 2.10

Institutional instability in Georgia

Insufficient financial resources due to economic hardship and inadequate human capacities are among the major obstacles to sustainable forest management in the region. In Georgia's case, in addition to widespread obstacles, another challenge prevails after independence, in particular following the Rose Revolution. In the past few years, the turnover in personnel in Georgia's state forest administration has been too frequent resulting in discontinuities in policy and programme implementation.

Some of the reasons for such frequent changes include removal of those employees involved in corruption, unattractive wages for professionals, lack of leadership and the changing of the political environment. Institutional instability makes it difficult for employees to carry out their activities and for external supporters to assist in forestry activities effectively.

Under this arrangement, coordination of protected areas becomes extremely difficult.

Increasingly, other government agencies also play an important role in promoting forest management, particularly the agencies in charge of agriculture, economy, education and statistics. For instance, recently the Kazakh Ministry of Education is promoting students' engagement in tree planting under the state programme *Zhasyl el* (Green Nation) in collaboration with the Ministry of Agriculture. In Turkmenistan, all the state agencies have to shoulder the responsibility (including provision of resources) for the green zone development in the country, which is based on the plan developed by Gok Gushak and the Ministry of Nature Protection.

West Asia

Policy and legal framework. The legal framework for forestry in the West Asia region varies among the countries. Forest legislation in Cyprus dates back to 1939 and has been periodically updated. Currently, efforts are under way to align it with European Union rules and regulations. Turkey also has a long history of legislation aimed to protect the forests from overexploitation. However, frequent changes in legislation, especially relating to ownership, have led to a number of problems, especially in demarcating forest boundaries (see Box 2.11). The government is currently preparing a reform package within the framework of European Union adaptation and is hoping to achieve more stability. Iran's forestry laws also have been in place for some time, since 1968, and have been amended

BOX 2.11

Legal and ownership changes in Turkey

- Turkey's first forest law was enacted in 1917.
- Forest Law No. 3116 enacted in 1937 established the first legal definition of forests and introduced the first set of forest policies.
- Forests were nationalized in 1945 to prevent their destruction by national and foreign contractors.
- Following the 1950 election, nationalized forests were restituted to their former owners.
- All forests, state and private, were brought under state supervision as per the provisions in the second constitution, adopted in 1961.
- A 1970 amendment to the constitution excluded forest land that had lost forest characteristics before 1961.
- The third constitution (now in force) broadened the criteria for exclusions and extended the cutoff date for exclusion from 1961 to 1982.

Source: FOWECA country outlook paper, Turkey.

several times since. All these countries have had a long history of forest protection through legislation that has been developing ever since they were established.

Laws regulating forest management in some countries, for example Jordan, focus mainly on prohibitions and limitations. Planning, management and development issues often receive insufficient attention. Lebanon has more specific legislation within its forestry sector. Under the Forest-related Regulations, for example, a natural protected area – Al Shouf Cedars – was established to preserve forest, plant and animal wealth; in addition charcoal production was banned, except for controlled production under certain conditions (this amendment was made to cater to poor communities that are dependent on charcoal).

In countries that have the least forest cover, forest legislation is limited to general environmental protection laws (Bahrain, Kuwait, Qatar and the United Arab Emirates); grazing regulations (Kuwait and Oman); and designations of protected areas for mangroves (Bahrain and Qatar). As for Saudi Arabia, its Forest and Rangeland Regulations have been in effect since 1978 and deal with the protection of vegetation, forests and rangelands, and the regulations for their use. The Saudi Arabia legal system is based on the Shariah, and provides a good foundation for sustainable development based on the wise use of all natural resources.

In the remaining countries, the legislative framework is either weak or not properly enforced. Yemen's Forestry Law has been in draft form since 1990 and the current environmental protection law only tackles forestry in general terms. In Afghanistan and Iraq, forestry laws exist, but current instability limits their implementation.

Institutional arrangements. In most countries of the region, forest land is state property, and public forest services and institutions have been responsible for their management. The Ministry of Environment and Forestry is responsible for all forestry activities in Turkey, while the forestry department of the Ministry of Agriculture is responsible for forestry activities in many of the other countries. Although the central government of the United Arab Emirates does not have a forestry department, there are forestry departments in the emirates of Abu Dhabi and Al Ain. Kuwait and Bahrain do not have any designated authorities responsible for forestry.

The recent trend in many countries is to transfer the responsibility of forest management to environment ministries. This reflects the growing concern for the provision of environmental services and the declining importance assigned to their productive functions. However, the lack of a clear mandate for different institutions in managing forest and rangeland resources is a major problem in most countries. Competition, the duplication of efforts and lack of cooperation are some of the main institutional challenges facing a number of countries.

NGOs are playing an increasingly important role in environment and forestry issues in many countries of West Asia. Generally, NGOs are active in areas that are not covered by governmental institutions or the private sector. NGOs

are more active in such countries as Cyprus, Jordan, Lebanon, the Syrian Arab Republic, Turkey and Yemen. Support received by the NGOs varies, and many of them depend on governments or international NGOs for financing their activities. There are also, however, independent NGOs addressing environmental and social issues.

Involvement of the private sector in forest management is limited and largely due to two factors: ownership issues, and the low productivity and poor commercial viability. The private sector is mostly involved with management tasks on a contract basis, such as forest protection. The private sector is of course the lead player in forest industries and in the trade of forest products.

There is also greater recognition of the role of local communities in decision-making relating to forests and woodlands, although many of the existing laws are yet to accommodate this. As noted earlier, before the advent of government control, communities were responsible for management of forests and pasturelands and they had workable arrangements that prevented overexploitation. These systems have disappeared. In most cases, government control through legislation undermined community management; however, at the same time, governments have not been able to provide an effective mechanism to manage the resources sustainably, particularly catering to local needs.

STATUS OF FORESTS AND FORESTRY: AN OVERVIEW

West and Central Asia is a low forest cover region; in 17 of the 23 countries forests cover less than 10 percent of the land area. The region accounts for around 1.1 percent of global forest cover. Productivity is extremely low because of the harsh environmental conditions and the preponderance of arid and semi-arid lands. Apart from a few countries, forest area is reported to be stable, although absence of reliable data makes it difficult to draw definitive conclusions. There are also differences in the definitions of forests and woodlands, and the classification system based on ownership adopted by the Central Asia and Caucasus countries – the State Forest Fund – seldom provides an indication of the actual ecological status or the way the land is used.

Most of the countries in the West and Central Asia region have extensive rangelands with scattered tree growth; however, information on their status is limited. Agroforestry is practiced quite extensively, especially by establishing windbreaks and shelterbelts in order to protect agriculture lands from desiccating winds. The region accounts for about 5 million hectares of planted forests, but much of this area is concentrated in a few countries with most of it established to fulfil environmental functions. Arid and semi-arid conditions make irrigation imperative for the success of afforestation and reforestation and urban forestry. A number of countries are using treated wastewater for establishing urban green spaces. The high costs of establishment and low productivity make industrial wood production uneconomical.

Policies and institutions in the forest sector have been largely geared to the provision of environmental services; however, the economic and social conditions

prevailing in most countries impose severe constraints on the institutions and in many cases the full potential of the available resources are not fully captured. While a number of countries are able to import most of the wood and wood products required, there are others that continue to depend on domestic supplies.

Q. MA

Beekeeping and honey production by a farmer in the Bura Forest, Yemen

3. Economic and environmental significance of forests and woodlands

The previous chapter provided an overview of the state of forests and forest management, including policy and institutional frameworks. Interventions by the different actors result in a varied flow of goods and services that cater to the diverse demands of society. Broadly, the benefits derived from forests and woodlands include products (wood and non-wood) and services, especially environmental benefits – biodiversity, maintenance and improvement of watershed values, arresting desertification, and the protection of agriculture and habitations from shifting sand dunes. Interventions within and outside the sector alter the flow of these goods and services. This chapter provides an overview of the economic and environmental significance of forests and woodlands in the West and Central Asia region.

PRODUCTION OF GOODS

Wood and wood products

In view of the low productivity of forests and woodlands, the current level of production of wood products is limited; therefore most of the countries highly depend on imports. Unrecorded wood removal is a serious problem in many countries, making it difficult to assess the actual level of wood production from forests. Although officially logging has been banned in most countries (exceptions being Cyprus, Georgia, the Islamic Republic Iran and Turkey), or harvesting has been limited to sanitary fellings, substantial quantities are removed illegally, which is often reported to far exceed what is legally permitted.

Agroforestry planting, especially the planting of fast growing species such as poplars and eucalypts outside state forests, forms an important source of wood supply. For example, Turkey's annual wood production from such plantations is estimated to be about 3.5 million m^3. Iran, Iraq, Kazakhstan and the Syrian Arab Republic are some of the other countries where a substantial quantity of wood is produced from farm trees. In Iran, for instance, around 58 percent of the annual production of wood (estimated at 1 million m^3) is from plantations and trees in orchards.

Table 3.1 gives an overview of the production, consumption and trade of the region's most important products in 2004. In view of unrecorded production, actual consumption of certain products will be higher than what was actually reported.

Notwithstanding the limitations stated earlier, the following observations can be made:

- In view of the high population, West Asia accounts for a major share of the consumption of all forest products. In 2004, West Asia accounted for 80 percent of the population in the region and consumed about 97 percent of industrial roundwood, 92 percent of paper and paperboard, 91 percent of sawnwood and 84 percent of wood-based panels. Within West Asia, Turkey produces most wood products as it has a high proportion of productive forests (see Box 3.1).
- As the degree of processing increases, the extent of dependence on imports increases. In 2004, the West and Central Asia region imported about 15 percent of the industrial roundwood consumed, but the share of imports in consumption was 45 percent for sawnwood, 56 percent for wood-based panels and 68 percent for paper and paperboard. For most countries, the exception being Turkey, the dependence on imports to meet consumption is very high.
- Per capita consumption of most products is far below the global per capita consumption and results from a number of factors. This is partly due to the decline in consumption in the Central Asian and Caucasus countries after their independence.

TABLE 3.1
Production, consumption and trade of important wood products, 2004

Product	West Asia	Central Asia and Caucasus	Total West and Central Asia	Per capita consumption, West and Central Asia	Global per capita consumption
Industrial roundwood *(m^3)*					
Production	13 845	161	14 005		
Imports	2 137	401	2 538		
Exports	121	58	179		
Consumption	15 861	503	16 364	0.047	0.258
Sawnwood *(m^3)*					
Production	6 718	339	7 057		
Imports	4 709	942	5 651		
Exports	81	186	267		
Consumption	11 347	1 095	12 442	0.035	0.065
Wood-based panels *(m^3)*					
Production	4 579	23	4 602		
Imports	3 821	1,489	5 310		
Exports	460	6	466		
Consumption	7 940	1 506	9 446	0.027	0.036
Paper and paperboard *(tonnes)*					
Production	2 146	222	2 368		
Imports	3 884	277	4 161		
Exports	365	6	371		
Consumption	5 665	492	6 158	0.018	0.055

Source: FAO, 2006b.

BOX 3.1

Wood industry in West Asia

In view of the limited forest resources, the region can only produce a small quantity of different types of wood products. Turkey dominates the production of all wood products in the region, and produces about 80 to 90 percent of the region's total production. Industrial roundwood and sawnwood production have relatively stagnated. Afghanistan, Cyprus, the Islamic Republic of Iran, Iraq and the Syrian Arab Republic produce, to a less extent, some industrial wood products and sawnwood as well. This trend reflects the availability of resources, increased awareness of environmental issues, the competition from imported products and the development of technology (medium-density fibreboards [MDF] and oriented strand board production in Turkey). Although the production of wood-based panels and paper and paperboard has expanded considerably in the past decade, and is mainly driven by Turkey's increased production, the production of these products in other countries such as the Islamic Republic of Iran, Iraq, Jordan and Lebanon has stagnated. In recent years, Turkey has significantly increased its production of medium-density fibreboards and paper and paperboard. However, all the countries in the region, including Turkey, are net importers of industrial wood products. Many countries are entirely dependent on imports to meet their domestic consumption.

Industrial roundwood. Industrial roundwood production is negligible in most countries because of low stocking and productivity of forests, but also because most forests have been set aside to fulfil protective functions. Table 3.2 shows the trends in the production and consumption of industrial roundwood for the region. For the region as a whole, consumption in 2004 was significantly lower than the 1990 level, largely owing to the decline of production and consumption in the Central Asian and Caucasus countries. Kazakhstan and Uzbekistan accounted for most of the consumption of industrial roundwood in Central Asia and the Caucasus. In 1990, their consumption accounted for about 70 percent of the Central Asia consumption, and although consumption has declined their share still remains above 70 percent of the regional consumption.

In the West Asia subregion, Afghanistan, Turkey and Iran are the most important consumers of industrial roundwood, accounting for about 98 percent of the consumption in 2004. These three countries have more or less maintained their high share in the subregional and regional production and consumption. West Asia is a net importer of industrial roundwood, which is mostly destined to Turkey with a limited quantity going to Iran, Saudi Arabia and the United Arab Emirates.

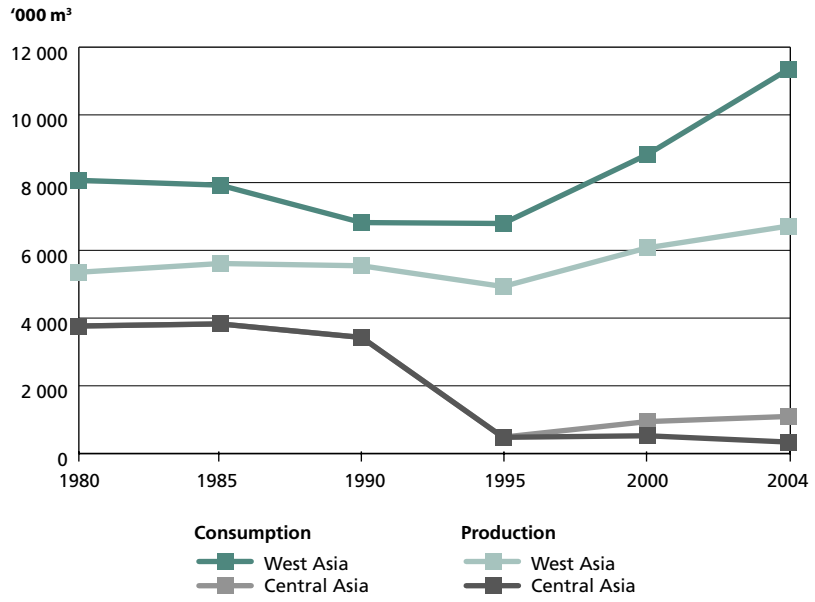
Sawnwood. Figure 3.1 indicates the trend in the production and consumption of sawnwood in the two subregions. The production of sawnwood in West Asia seems to be levelling off, while consumption is increasing, necessitating increased imports.

TABLE 3.2
Production and consumption of industrial roundwood[a] *('000 m³)*

Region	1980	1990	1995	2000	2004
West Asia	12 293	8 465	13 695	13 369	13 845
	(12 692)	(9 376)	(14 498)	(14 962)	(15 861)
Central Asia and Caucasus	2 063	1 931	594	315	161
	(9 645)	(9 512)	(817)	(346)	(503)
Total West and Central Asia	**14 356**	**10 396**	**14 288**	**13 684**	**14 005**
	(22 337)	**(18 888)**	**(15 315)**	**(15 309)**	**(16 364)**

[a] Figures in parenthesis are estimated consumption.

FIGURE 3.1
Trends in production and consumption of sawnwood



Turkey produces most of the sawnwood in West Asia, with Iran, Saudi Arabia and the United Arab Emirates accounting for a major share of the imports. In Cyprus, declining wood production along with such factors as low labour availability and higher wages have led to closure of sawmills (see Box 3.2)

As with other products, Central Asia's production and consumption of sawnwood markedly declined in the post-1990 period; the consumption in 2004 was just about 16 percent of the 1990 level. Even if an allowance were given to unrecorded production and consumption, the figure is still far lower than that of the pre-independence period. However, some countries have seen a marginal increase in consumption since 1995, particularly Armenia, Azerbaijan, Georgia and Uzbekistan.

BOX 3.2

Wood industry changes in Cyprus

Cyprus Forest Industries Ltd was established 1970 and is the main company operating in the wood industry sector. The major shareholder is government, with 51 percent of the capital share. The company used to have a unit for producing particle boards and sawn timber using local pine wood but it closed down due to the lack of raw material. The major products have shifted to secondary processing products, e.g. dressing imported particle boards and medium-density fibreboards with veneer sheets and plywood using imported wood.

The Kambos village is enclosed in a state forest area. The village used to depend on timber production before 1995. The sharp decrease in timber production in this area has produced in some negative outcomes to the village. Three of the village's five sawmills closed down because of shortages in raw material. In addition, logging costs are growing because of insufficient log production. In one surviving small sawmill, imported roundwood provides more than 50 percent of raw material consumption for sawnwood production, and six foreign workers from a total of 15 are employed to reduce production costs.

Source: FOWECA country outlook paper, Cyprus.

Wood-based panels. Table 3.3 shows the trends for the production and consumption of wood-based panels in the West and Central Asia region. Although the figures need to be interpreted with caution in view of the weak national reporting system, the overall trend is evidently upward. This is particularly the case with West Asia, where production and consumption registered an annual increase of about 10 percent and 11 percent, respectively, in the 1990-2004 period. Both production and consumption of panel products declined drastically in Central Asia during the post-1990 period, with recovery beginning only after 1995.

In West Asia, Iran, Lebanon, the Syrian Arab Republic and Turkey are the most important and probably the only producers of wood-based panels; all other countries are dependent on imports to meet their domestic needs. The rapid growth of importing wood-based panels since 1980 is largely in response to the increasing demand from the construction and furniture sectors. Rapid urbanization and the consequent construction boom will continue to boost the demand for panel products. Key producer countries, especially Iran and Turkey with significant domestic demand, have invested in additional capacities for the production of medium-density fibreboard (see Box 3.3).

Paper and paper products. Paper and paperboard is one of the more important items of forest products the region imports and there has been a steady increase

TABLE 3.3
Production and consumption of wood–based panels[a] *('000 m³)*

Region	1980	1990	1995	2000	2004
West Asia	610	1,159	1,945	2 876	4 579
	(1 505)	(1 889)	(3 168)	(4 680)	(7 940)
Central Asia and Caucasus	–	–	0	55	23
			(4)	(394)	(1 506)
Total West and Central Asia	**–**	**–**	**1 945**	**2 931**	**4 602**
			(3 173)	**(5 074)**	**(9 446)**

[a] Figures in parentheses are estimated consumption.

BOX 3.3
MDF consumption in the Islamic Republic of Iran and imports from Turkey

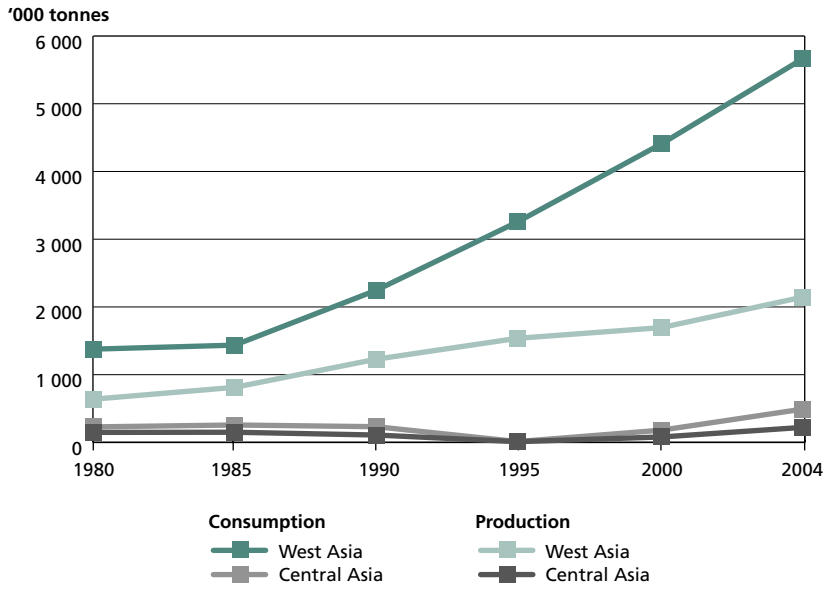
Between 1996 and 2003, the entire MDF consumption in Iran was supported by imports and in 2004, in spite of the production in Iran, most of the consumption was still reliant on imports… Countries which export MDF to Iran include Turkey, Malaysia, the United Arab Emirates, Russia, Germany, Italy, Spain, Romania, France and Belgium among others. Turkey supplies about half of the imported board. The proximity of Iran and Turkey – and the existence of fast and cheap connections such as railway and road, cheaper transportation and a long history of commercial exchange between these countries on the one hand and the over capacity of MDF in Turkey and the competitive prices – are good reasons that encourage the Iranian consumer to import MDF from Turkey.

Source: Wood Based Panels International (www.wbpionline.com/story.asp?sc=36446&ac)

in the volume and value of their imports since 1990. In 2004, the region imported paper and paper products valued at US$3.2 billion. Turkey is the only country that has substantial production capacity, and in 2003 production was adequate to meet about 66 percent of consumption. Most other countries, however, depend on imports to meet the domestic demand of printing and writing paper. In a number of Gulf Cooperation Council countries, there has been a large expansion of production of tissue paper and corrugated cartons (Mubin, 2004).

Figure 3.2 illustrates the trends in production and consumption of paper and paperboard in the West and Central Asia region. Paper and paperboard production in the region has increased substantially, especially in the post-1990 period. Production capacity, though, has grown much slower, and imports have increased. In Central Asia, production and consumption declined in the post-1990 period, but since 1995 there has been some upward trend. Although the 2003

FIGURE 3.2
Trends in production and consumption of paper and paperboard



consumption remained below the 1980 and 1990 levels, rapid economic growth could boost consumption.

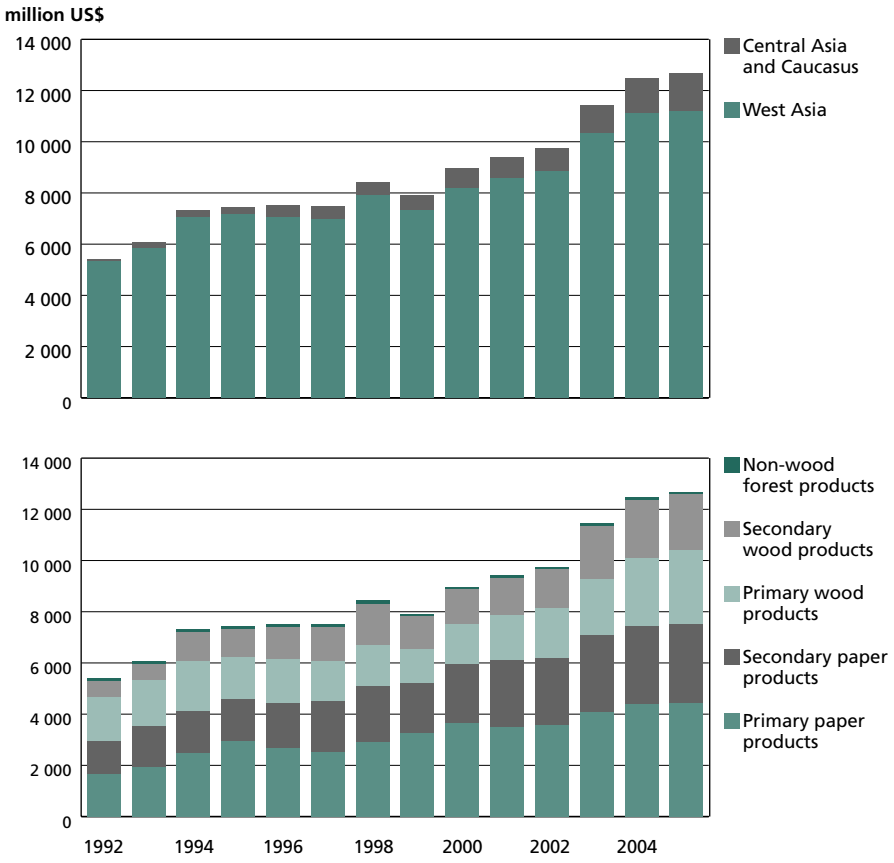
Forest products trade

In view of the rapid growth in consumption (due to increasing incomes and very low levels of consumption) and the limited levels of domestic production, countries have considerably increased their imports of forest products, from about US$5.4 billion in 1992 to more than US$12.7 billion in 2005 (see Figure 3.3).[3] Imports increased for almost all types of forest products. Primary and secondary paper products, for instance, accounted for almost 60 percent of the value of imports. The importing of secondary wood products, mostly furniture, also shows that demand is increasing significantly.

The main importers of forest products are Iran, Kazakhstan, Saudi Arabia, Turkey and the United Arab Emirates, which together accounted for about 65 percent of the value of imports in 2005. All indications show that imports will continue to grow rapidly, in view of the continued growth of the economies and the consequent increased demand for various wood and wood products. The booming construction sector in many countries, especially in West Asia, has led to the fast growth in wood imports (Box 3.4). The growth in imports is particularly

[3] These figures are adjusted for inflation and shown at the price levels and exchange rates for the year 2005.

FIGURE 3.3
Imports of forest products in West and Central Asia, 1992–2005



BOX 3.4

Construction boom in the United Arab Emirates and wood imports

According to data compiled by the Statistics Department of Dubai Ports, Customs and Free Zone Corporation, the total trade of wood and wood products registered increased by 37.5 percent in 2005 over the previous year. Nearly a third of this amount (about US$435 million) is re-exported to other countries within and outside the region. This rapid growth is attributed to the booming construction sector. Furniture and furniture parts formed the bulk of the total trade. China ranked first on the list of exporters of wood and wood products to Dubai with a 26.7 percent share, followed by Chile, Indonesia, Italy and Malaysia.

Source: Malaysian Timber Industry Board, 2006.

notable in the Central Asia and Caucasus subregion. In 1995, the Central Asia and Caucasus countries imported wood and wood products valued at US$300 million; in 2005 this amount had increased to more than US$1 500 million – over 50 percent of this amount, however, is accounted by Kazakhstan, whose economy is quickly recovering from the post-1991 decline.

Most products imported to the region come from Europe, including the Russian Federation (paper and primary wood products), and Asia (primary and secondary wood products, especially furniture).

Some of the countries in the region have also emerged as important exporters of wood and wood products, in part by re-exporting goods to other countries in the region. Between 1992 and 2005, the value of exports from the countries in the region increased more than twofold, from about US$1.2 billion to US$2.8 billion. Jordan, Lebanon, Saudi Arabia, Turkey and the United Arab Emirates were the primary exporters in 2005. Of these countries, Turkey has developed a vibrant forest industry (especially panel products and furniture) based on its domestic wood resources as well as imports. Other countries have also established processing capacity at the higher ends of the value chain based on imported inputs, for example producing sanitary paper and corrugated cartons from imported waste paper.

Woodfuel

While there has been a rapid substitution of woodfuel for fossil fuels, in several countries rural people continue to depend on wood as the main source of domestic energy, especially for cooking and heating. Since woodfuel harvesting largely takes place in the informal sector, reliable data on production and consumption are not available. The estimated trend of woodfuel consumption is presented in Table 3.4.

While fuelwood consumption has declined, charcoal consumption has increased, largely reflecting the impact of urbanization and changes in lifestyles. Fuelwood consumption increased only in several countries, Afghanistan, Tajikistan, Uzbekistan and Yemen, for example. Turkey's fuelwood consumption has declined significantly, from about 10.1 million m^3 in 1990 to about 5.9 million in 2005. Notwithstanding this reduction, Turkey still accounts for about three-fourths of the regional fuelwood consumption.

TABLE 3.4
Estimated woodfuel consumption in the West and Central Asia region

Year	Fuelwood *(million m^3)*	Charcoal *(million tonnes)*	Total woodfuel[a] *(million m^3)*
1990	11.76	0.51	14.79
1995	11.50	0.65	14.38
2000	9.74	0.73	14.13
2005	8.13	0.81	12.97

[a] Charcoal in tonnes converted into equivalent woodfuel in cubic metres.
Source: Broadhead, Bahdon and Whiteman, 2001.

As shown in Table 3.4, almost all the countries in the region (especially the Arabian Peninsula countries) are experiencing an upward trend in charcoal consumption, except for Iran where its charcoal consumption has been declining since 1990. Most countries in the region, in fact, import charcoal to meet the increasing demand.

With the exception of Turkmenistan (where gas, electricity and water are supplied free of cost), in most of the other Central Asia and Caucasus countries the demand for woodfuel has increased since independence because of the decreased supply of accessible and affordable alternative energy sources (see Box 3.5). In Georgia and Tajikistan, more than 80 percent of rural households depend on woodfuel as the main source of cooking energy. Disruption of gas supplies is a major concern for countries such as Georgia as this could have a significant impact on woodfuel demand.

Woodfuel accounts for about 85 percent and 70 percent of household energy in Afghanistan and Yemen, respectively. In Afghanistan, consumption of woodfuel has increased owing to disruption of commercial fuel supplies because of conflict. Iraq, despite being a major producer of oil, is also experiencing a similar situation, as war-related disruption in commercial fuel supplies has led to increased woodfuel consumption.

BOX 3.5

Double hardships – limited legally harvested fuelwood and decreased energy supply

During the Soviet period, some harvesting was carried out in the forests of Azerbaijan. In 1991, the Government of Azerbaijan decided to ban industrial felling in order to enhance the environmental functions of forests. At the same time, the break up of the integrated Soviet economy resulted in a disruption of 1.2 m^3 to 1.5 million m^3 of timber annually imported from the Russian Federation. Because only maintenance and sanitary felling have been officially permitted, fuelwood volume obtained from legal harvesting has become limited.

Extensive power and gas networks in Soviet times were capable of delivering electricity and acceptable quality gas to most of the population. After independence, however, lack of investment and limited maintenance have resulted in significantly deteriorating these networks.

Subsequent loss of access to energy sources has forced people to cut down trees for fuelwood for sustaining their livelihoods, which was mostly illegal under the government decision.

Whether there is a logging moratorium or not, insufficient supplies of fuelwood and other energy sources have resulted in similar consequences in the region, apart from Turkmenistan.

Source: FOWECA country outlook paper, Azerbaijan; Savcor Indufor, 2005.

BOX 3.6

Decrease in woodfuel consumption in Iran

In recent years, Iran has made a concerted effort to reduce the dependence on woodfuel for meeting household energy needs. Woodfuel production from Caspian forests reduced from 771 000 m^3 in 1979 to about 379 000 m^3 in 2003. Fossil fuel supply has been expanding rapidly because gas pipelines have been extended even to remote areas.

Source: FOWECA country outlook paper, Islamic Republic of Iran.

In some countries – Cyprus, Lebanon, Oman, the Syrian Arab Republic, Turkey, Saudi Arabia and the United Arab Emirates – dependence on woodfuel has declined largely because of the growth in incomes, increased urbanization and improved access to commercial fuels (see Box 3.6). There are exceptions to this trend: Jordan's woodfuel production and consumption have increased during the past 15 years, partly due to the greater use of charcoal, especially in restaurants. An increase in income also encourages traditional methods of cooking using charcoal, often because it is a status symbol.

In order to protect forest and tree resources from overexploitation, some of the countries have formulated rules and regulations to control fuelwood collection and charcoal production. For example, in 2000 Saudi Arabia imposed a ban on wood collection and charcoal production for a period of five years and permitted the import of fuelwood and charcoal to meet the domestic demand. The Syrian Arab Republic has adopted a system of licensing charcoal production from forests and fruit trees. Such restrictions have not always helped to deal with the problem, especially because of the limited institutional capacity to enforce the regulations. The existence of sale outlets for domestically produced charcoal in countries such as Saudi Arabia indicates the persistence of demand and the difficulties in enforcing legislation.

Non-wood forest products

Non-wood forest products (NWFPs) are an important source of livelihood in all the countries in the West and Central Asia region. They range from subsistence items to products traded on the international markets. Insufficient information, mostly because of the unorganized collection, processing and trade of these products, makes it difficult to assess the precise nature of their contribution. Often the information available is general and rather qualitative.

Important non-wood forest products in the Central Asia and the Caucasus region include nuts, berries, honey, medicinal plants and wildlife (see wildlife management). These products are particularly important at the local level. For example, in southern Kyrgyzstan walnut is the most important NWFP and is a

major source of cash income for the local population, especially during years of good harvest (Fisher *et al*., 2004). Similarly, pistachios are important for a number of countries (for example Turkmenistan, see Box 3.7). In most cases, people are allowed to collect them freely. In Kyrgyzstan, collectors have to pay a fee to forestry enterprises (*leskhozes*) after reaching a certain quantity. Most of the NWFPs support local economies, providing the base for small-scale, household-based enterprises. Some *leskhozes* in Central Asia hire local people to collect and process NWFPs thus providing employment opportunities, though the income from such employment remains limited (CAREC, 2006). Since the informal sector dominates the collection and trade of most NWFPs, very little information is available on their actual economic significance, and this possibly results in the neglect of their management (Asanbaeva, 2005).

The main non-wood forest products in West Asia include medicinal and aromatic plants, herbs and spices, gums, resins, tannins, mushrooms, honey, fruits and nuts. In some cases, fodder is also considered a non-wood forest product as a large number of livestock depend on it from forests and woodlands. NWFPs are more valuable than wood products in some West Asian countries (in Lebanon, Oman and Saudi Arabia). However, in most countries information on production, processing and marketing is poor. Because the production and trade of a number of NWFPs are in the informal sector, regulations relating to harvesting and trade do not exist. Overexploitation of resources is widespread.

A number of countries in the West Asia region have emerged as major exporters of non-wood forest products (see Box 3.8). Some NWFPs, such as bay leaves in Turkey, are important commercially. The production of bay leaves has increased about six times, from 1 062 tonnes in 1989 to 6 626 in 2002. The development is also a reflection of the increased private investments in processing and marketing of NWFPs. Improvements in storage and packaging technologies (especially to maintain freshness) have helped to improve trade prospects. The export of thyme and bay leaves increased from US$21.0 million in 2002 to US$29.0 million in 2004.

BOX 3.7

Pistachio forests in Turkmenistan

Pistachios grow individually or in small thickets in southern Turkmenistan. A total area of natural pistachio forests in Turkmenistan reaches more than 80 000 ha. The high oil content in the fruit has been used in food preparation and food processing and the tannin and gum for lacquer production. They provide a significant income to those who grow and sell the products. Disease and dry-wind resistant, pistachios also serve as fodder for animals. Pistachio is very precious for dry horticulture in Turkmenistan.

Source: CAREC, 2006.

BOX 3.8

International trade of NWFPs from West Asia

The UN Comtrade data provide a general indication of the increasing importance of some of the non-wood forest products from the West Asia region. In 2003, Iran exported 185 million kilograms of pistachios, whose export value was estimated at US$680 million and accounted for 2 percent of the total national export. With 76 percent of the global exports in 2003, Iran is the biggest exporter of pistachios in the world. Afghanistan is another important exporter of pistachios, with an export volume of 513 000 kilograms and an income of US$1.9 million in 2002. Turkey is the largest exporter of thyme and bay leaves, earning an income of US$29 million in 2004. Turkey is also the fifth largest chestnut exporter, exporting 8 million kilograms, earning an income of US$12 million in 2003. Lastly, Iran, Turkey and Yemen are the main exporters of natural honey in the region.

PROTECTIVE BENEFITS AND SERVICES

Forests and woodlands in the West and Central Asia region provide a number of environmental services, including conservation of biological diversity, protection of watersheds and arresting land degradation and desertification. Increasing emphasis is also being given to the recreational and amenity functions of forests and woodlands and, as noted earlier, substantial investments are being made to establish and manage urban and peri-urban forests. For most countries, these environmental services are probably more important than the productive functions of their forests and woodlands.

Conservation of biological diversity

Biodiversity hotspots. The wide range of topographic, soil and climatic conditions in the West and Central Asia region has resulted in highly diverse ecosystems, ranging from coastal mangroves to alpine forests and deserts to humid forests. Of the 32 global biodiversity hotspots five are located in the region (see Box 3.9).

The mountains of Central Asia are particularly significant for their biodiversity value. Due to the several altitudinal zones, they are characterized by high diversity at the ecosystem, population and species level (Magin, 2005). Mountain ecosystems serve as a place of origin for many cultivated plants and animal breeds and a refuge for several globally important species. Considerable areas in the Central Asia mountains have wild fruit-bearing forests, and represent the genetic centres of origin of cultivated varieties of apple, pear and pomegranate. The Caucasus is also characterized by a high level of endemism (UNEP, 2002).

Extent of protected areas. Almost all countries are signatories to the Convention on Biological Diversity and are making efforts to protect and manage important biomes and ecosystems. Many countries have prepared national biodiversity action

BOX 3.9
Biodiversity hotspots in West and Central Asia

Conservation International has identified the following five biodiversity hotspots in West and Central Asia:

- ***Mountains of Central Asia:*** The hotspot's ecosystems range from glaciers to desert, and include areas that provide refuge to a number of threatened plants and animals.
- ***The Caucasus:*** The deserts, savannas, arid woodlands and forests that comprise the Caucasus hotspot contain a large number of endemic plant species.
- ***The Irano-Anatolian region:*** Forming a natural barrier between the Mediterranean Basin and the dry plateaus of Western Asia, the mountains and basins that make up the Irano-Anatolian hotspot contain many centres of local endemism. The greatest threat to the Turkish part is the development of irrigation schemes for agriculture and associated infrastructure, such as dams.
- ***The Mediterranean Basin:*** It has 22 500 endemic vascular plant species. Tourism development has placed significant pressure on coastal ecosystems.
- ***The Horn of Africa:*** This extends to the southwestern part of Saudi Arabia as well as Yemen and Oman. The junipers in the region form a unique ecosystem and are subjected to severe degradation.

Source: Conservation International, 2005.

programmes – often with external support – and much of the effort is directed towards establishment and management of protected areas. Table 3.5 shows the proportion of protected areas in the different countries of the region.

The extent of protected areas (IUCN Categories I to IV) in the West and Central Asia region is about 32.5 million hectares, accounting for about 3.0 percent of the region's land area. In West Asia, Iran and Saudi Arabia account for 94 percent of the protected areas while in Central Asia and the Caucasus, Kazakhstan alone accounts for about 49 percent of the protected areas. In terms of the proportion of land area covered, Tajikistan has about 18.3 percent of its area protected. Other countries having a high proportion of protected areas are Armenia with 10.1 percent and Cyprus at 8.2 percent. In addition, some countries have areas that have been declared protected but do not fall under IUCN Categories I to IV. Saudi Arabia is an example; when such areas are included, its protected area increases from 1.8 percent to about 38 percent of the land area.

While the extent of protected areas is impressive, there are two key issues concerning protected areas:

- Coverage of critical ecosystems: the existing protected area system encompasses some of the ecosystems and ecoregions but others – notably steppes, deserts and semi-desert – are poorly represented. Temperate grasslands typical of Central Asia are poorly protected.

TABLE 3.5
Extent of terrestrial protected areas (IUCN categories I to IV)

Country or area	Protected areas (IUCN categories I to IV)	
	Area *(ha)*	% of land
Kazakhstan	7 741 945	2.8
Kyrgyzstan	608 290	3.0
Tajikistan	2 602 925	18.3
Turkmenistan	1 883 220	3.9
Uzbekistan	2 050 293	4.6
Total Central Asia	**14 886 673**	**3.7**
Armenia	299 107	10.1
Azerbaijan	393 651	4.5
Georgia	290 276	4.2
Total Caucasus	**983 034**	**5.3**
Afghanistan	218 629	0.3
Bahrain	800	1.1
Cyprus	75 957	8.2
Iran (Islamic Republic of)	10 373 294	6.3
Iraq	541	0.0
Jordan	913 300	10.2
Kuwait	250	0.0
Lebanon	3 500	0.3
Oman	22 000	0.1
Qatar	50	0.0
Saudi Arabia	3 923 000	1.8
Syrian Arab Republic	289 646*	1.5
Turkey	804 312	1.0
United Arab Emirates	40	0.0
Yemen	0	0.0
Total West Asia	16 625 319	2.5
Total West and Central Asia	**32 495 026**	**3.0**

Source: UNEP–WCMC, 2005; figures for Syrian Arab Republic provided by the Directorate of Forests.

- Protected areas established for recreation and tourism: the value of such protected areas for biodiversity conservation is rather limited, because this is not their focus.

Issues in the management of protected areas. The level of management in protected areas varies enormously, depending primarily on the financial and institutional capacities. Some of the protected areas are highly degraded and receive little or no protection. Boundaries are often not clearly marked and local people may not even be aware of their protected status. Designated park areas often exclude areas of high biodiversity that are just beyond the boundary, while large-scale farming areas and high-intensity tourism sites are included. Poor infrastructure, limited staff and

insufficient financial support undermine the efficacy of protection. Agricultural expansion has been one of the major factors contributing to biodiversity loss (see Box 3.10). Other issues that affect biodiversity conservation in the West and Central Asia region include:

- Intersectoral issues have not been addressed effectively and frequently the key players who influence land-use decisions are not involved in the decisions relating to biodiversity conservation. Coordination of biodiversity conservation is primarily the responsibility of the environment department, but resource constraints limit its ability to implement the tasks assigned to it. Often it is relatively powerless to influence the decisions of other ministries or departments.
- Discontinuities in the policy and institutional environment are a major problem in conserving biological diversity. Frequent institutional changes have undermined the continuity of various initiatives.
- Often the National Biodiversity Action Plans tend to be a wish list of projects, primarily aimed to secure external funding. Very few of them have concrete proposals for mobilizing internal resources and how biodiversity conservation aspects could be incorporated into national development priorities, especially in the use of natural resources.

Watershed protection

Water is probably the most critical natural resource in the West and Central Asia region and is a key concern for national and regional security. The degradation of watersheds and the consequences on the water supply, including for irrigation and power generation, have been reported widely (see Box 3.11). While soil erosion

BOX 3.10

Agricultural expansion: a threat for biodiversity conservation

In Kazakhstan, agriculture is one of the main threats for ecosystems. In the 1950s, more than 90 percent of the area of regular *chernozems* and around 60 percent of dry steppes were ploughed. This led to serious wind erosion, and dust storms became common. The steppe areas that remained are considerably modified because of overgrazing.

In Turkey, in the eastern part of the ecoregion, agriculture is so extensive that, except in the hilly areas, all the natural vegetation has been converted to fields. Even in the hilly areas, natural communities are highly degraded as a result of overgrazing.

Economic and socio-cultural changes are causing a decline in the environmental quality in the Caucasus. Urban and rural developments have converted most lowland forests to agricultural and development lands.

Source: WWF, 2005.

BOX 3.11
Watershed degradation in Iran

As with most of the other countries in West Asia, water availability is the most critical issue with regards to sustaining and expanding agriculture production. In most parts of Iran, the limited precipitation (about 250 mm) is confined mainly to the cold winter season and is often short and intense. In the absence of vegetation and the degradation of catchments, soil erosion and floods are common. Since Iran relies heavily on dams to meet its irrigation requirements, siltation is a major problem, reducing the capacity of reservoirs. Some examples are the Latian, Sefidrud and Dez dams, which will be filled in the near future.

Source: Iran Daily, 2000.

and watershed degradation are recognized as important problems, it is necessary to assess the potential role of forests in providing a solution, especially in the context of several factors that influence the hydrology in the region. General statements on the positive hydrological functions of forests, in particular "the sponge effect" of the forest floor in absorbing and releasing water, have often ignored the specific situation in the various watersheds. Two key issues that need to be addressed are:

- the extent to which forests and trees augment and regulate the supply of water, including maintaining its quality;
- the demand for water for afforestation and reforestation, which competes with alternative uses.

Major watersheds in the region. Many rivers in Central Asia, the Caucasus and West Asia traverse more than one country, and managing demand and supply between countries creates economic, social, institutional and political problems. The role of forests in regulating water flow needs to be seen in this context. Table 3.6 shows the extent, number of countries covered, population and land use of the major transboundary watersheds in West and Central Asia.

As shown in Table 3.6, the extent of forest cover in all the important watersheds in the region, excluding that of the Ob River (whose catchment largely falls in China, Mongolia and the Russian Federation), is rather negligible, varying from 0.1 percent for Amu Darya to 2.4 percent for Syr Darya to 4 percent for Lake Balkhash. The Kura and Araks watershed has higher forest cover (7.1 percent) as a large part of it is situated in the relatively better forested country of Georgia.

Because almost all watersheds are predominantly grassland and cropland, watershed benefits depend primarily on the management of these land uses. Considering the complex nature of hydrology and the multitude of factors that affect the quantity and quality of stream flow, afforestation efforts will have to be integrated with other land uses. Given the preponderance of arid and semi-arid land, particular

TABLE 3.6
Major watersheds in West and Central Asia

Watershed	Watershed area (km^2)	Countries within the watershed	Population density (per km^2)	Percent of watershed that is:				Large dams in progress	% of protected area
				Cropland	Forest	Grassland	Arid area		
Amu Darya	534 739	Afghanistan Kyrgyzstan Tajikistan Turkmenistan Uzbekistan	39	22.4	0.1	57.3	72.0	2	0.7
Kizilirmak	122 277	Turkey	55	38.0	1.6	52.0	84.9	9	0
Kura and Araz	205 037	Armenia Azerbaijan Georgia Iran Turkey	75	54.0	7.1	30.6	25.4	4	4.3
Ili-Balkhash	512 015	China Kazakhstan Kyrgyzstan	11	23.2	4.0	61.1	91.6	0	7.2
Ob	2 972 493	Mongolia China Kazakhstan Russian Federation	10	36.9	33.9	16.0	42.5	0	1.9
Syr Darya	782 617	Kazakhstan Kyrgyzstan Tajikistan Uzbekistan	28	22.2	2.4	67.4	88.5	4	1.0
Tigris and Euphrates	765 742	Iran Iraq Syrian Arab Republic Turkey	57	25.4	1.2	47.7	90.9	19	0.4

Source: WRI, 2005.

attention will have to be paid to ensure that afforestation does not enhance water loss through increased evapotranspiration. More importantly, afforesting degraded pasture- and agricultural land may face significant economic constraints.

The regulatory functions of forests and woodlands seem to be more important for small watersheds. Total rainfall may be low, but its intensity can be very high, causing high levels of run-off. The problem mainly stems from land-use changes, especially when woodlands are cleared for high-tillage crops without adequate soil and water conservation measures. Increased grazing, far beyond the carrying capacity of the land, causes soil compaction and is another factor that reduces infiltration and enhances run-off. Increased urban build up and infrastructure development (especially roads) have reduced the proportion of water that seeps into the soil, resulting in increased peak flows and reducing the duration of stream flow. Grazing and woodfuel collection (especially production of charcoal) are important causes of land degradation, undermining watershed values.

Causes of watershed degradation. As with biodiversity, watershed management issues and the role of forests and trees therein, need to be considered in the larger socio-political, economic and environmental context. Because most of the countries in the region are arid and semi-arid with low precipitation, the potential to increase

renewable water supplies is rather limited. Some of the important considerations in the context of the West and Central Asia region are:

- population growth and its consequence on land use, especially agriculture and animal husbandry;
- development of the industrial and services sectors and consequent changes in the demand for water;
- policies and institutional capacity to make necessary changes in the way water is used and how demand and supply are balanced;
- knowledge on watershed management.

Integrated approaches to watershed management. Although forests and trees have important regulatory functions, these depend on a number of other factors, which need to be taken into account in watershed management initiatives. Frequent land-use changes, including cultivation of high-tillage crops, are particularly damaging to the stability of water flows. Increasingly, watershed management efforts are adopting an integrated approach, which addresses the human dimension and the mosaic of land uses in a given ecological context, with substantial emphasis on improving agricultural practices and enhancing the incomes of local communities. An example is the Anatolia Watershed Rehabilitation Project in Turkey (Box 3.12). Furthermore, there is greater emphasis on enhancing local community participation, especially through making appropriate changes in policy and legal and institutional frameworks.

BOX 3.12

Anatolia Watershed Rehabilitation Project

This seven-year project approved in 2005 and covering 28 micro-catchments has a number of interrelated components, namely the rehabilitation of degraded natural resources; income-raising activities; strengthening policy and regulatory capacity towards meeting European Union standards; and awareness-raising, capacity building and replication strategy. The main activities under the rehabilitation of degraded natural resources component include:

- rehabilitation of forest land including soil conservation by afforestation, protection and improvement of poor and degraded soils, gallery plantation, rehabilitation of oak coppices and of degraded high forests, participatory replanting and inventory of non-wood forest products;
- rangeland rehabilitation, including improved management of forest rangelands and rehabilitation of rangelands outside forests;
- rehabilitation of agricultural land including fallow reduction and appropriate use of marginal agricultural land; and
- environment-friendly agricultural practices.

Source: World Bank, 2005.

Poverty alleviation and strengthening local level institutional arrangements underpin most watershed management efforts.

Control of desertification

Almost all countries (except Cyprus) in the West and Central Asia region are affected by desertification, and in 9 of the 23 countries, drylands account for over 90 percent of the land area. All West Asian countries are located in the arid and semi-arid zone and about 79 percent of land is desert or desertified. In addition, another 16 percent is vulnerable to desertification. The preponderance of arid and semi-arid areas, poor management of water resources, including excessive extraction of groundwater that results in lowering water tables (and in many coastal areas creates salt water intrusion), and land-use practices that are beyond the carrying capacity (see Box 3.13) are the key factors contributing to desertification.

Forestry plays important preventive and remedial roles in combating desertification. Most attention hitherto has been on the latter, especially when adverse effects become very evident. Preventive actions are often neglected as a result of policy, institutional and economic constraints. Governments find prevention particularly difficult if more comprehensive approaches require significant policy and institutional changes. Key areas of forestry interventions include:

BOX 3.13

Desertification in West Asia

Land degradation and, at its extreme, desertification, continue to be the most significant environmental issues in West Asia, especially in countries where the agricultural sector makes a significant contribution to the national economy. There is extensive desert in the region, ranging from 10 percent in the Syrian Arab Republic to nearly 100 percent in Bahrain, Kuwait, Qatar and the United Arab Emirates. Desertification has also affected wide areas of rangelands in Iraq, Jordan, the Syrian Arab Republic and the countries of the Arabian Peninsula. The causes include a combination of climate, high population growth rates and intensive agriculture. Poverty and inappropriate government policies exacerbate the problem.

Geopolitical instability in and around the countries of West Asia has persuaded governments to adopt policies aimed at achieving national food security. These policies have been accompanied by agricultural protectionism, the erection of trade barriers and government subsidies for agricultural inputs. Subsidies, together with free or cheap irrigation water, have had severe impacts on land and water resources and have contributed to the unsustainability of agriculture in the region. As a result, land degradation has become widespread, and it has accelerated as more rangelands have been reclaimed and put under cultivation.

Source: UNEP, 2002.

- improved management of vegetation (which involves a large array of policy, institutional, legal and technical interventions), including attention to the problem of forest fires;
- remedial measures, particularly afforestation of degraded areas to stabilize soil and to prevent further erosion through wind and water, and protective measures, particularly establishment of shelterbelts and windbreaks to maintain the productivity of agricultural and other land. Sand-dune fixation is a key area in several countries (see Box 3.14). Most countries are also establishing "green belts" to improve the microclimate and to enhance recreational values in urban areas.

Forestry interventions have largely focused on technical aspects, especially to establish windbreaks and shelterbelts and to stabilize sand dunes using species that are well adapted to the adverse environmental conditions. Producing a sufficient number of seedlings to meet the demands from government organizations (including those of the forestry departments) and farmers and adopting appropriate techniques for planting and aftercare have received considerable attention. Substantial work has been done on aspects such as designing shelterbelts and windbreaks and techniques for sand-dune stabilization. In almost all cases, establishment of shelterbelts and windbreaks and other amenity planting requires irrigation, especially in the first few years. In the extremely arid and semi-arid conditions this is critical for successful planting. Particular attention has been given to:

- economize water use, especially through drip irrigation;
- use of treated wastewater to establish green belts and other amenity planting in urban areas.

A number of countries in West Asia have pursued these actions, especially with the urban greening initiatives. The costs of these planting initiatives are very high and hence their wider adoption largely depends on resource availability. Most of

BOX 3.14

Control of desertification in the United Arab Emirates

A variety of sand dunes are found in various parts of the Emirates. Recent observations made on the comparatively stable and mobile dunes in the Western Region of Abu Dhabi indicate that they may be moving at the rate of 2 to 3 metres annually in the direction of the wind. A number of methods and techniques are being used to check their advancement.

The sand has to be physically removed by using heavy earth moving machinery to clear the roads or to save habitations and farmlands. Physical impediments such as cement asbestos sheets, galvanized iron sheets or date palm fronts are erected to across the main prevailing direction of the wind. As a long-term measure, live shelterbelts or windbreaks of arid-zone species are raised to reduce wind velocity and to prevent the sand invading the habitations and agriculture. Both live shelterbelts and windbreaks and block plantations are being used to lessen or check encroachment by sand.

these efforts tend to be focused on key urban centres; cities that are emerging as centres of trade, tourism and manufacturing are receiving increased attention in this regard.

Afforestation of the exposed Aral Sea bed is a major joint initiative in a number of countries. The drying up of the Aral Sea and its consequences for extensive agricultural areas because of the deposition of toxic salts is a major environmental problem affecting a number of Central Asian countries (see Box 3.15). The environmental conditions make it extremely challenging to undertake reforestation in the dry seabed. Temperature fluctuates from –40°C in winter to 40°C in summer, with the rainfall amounting to about 300 mm. A number of techniques have been adopted to afforest the area and to stabilize the sand. Although there was a scaling down of afforestation efforts immediately after the break up of the Soviet Union, efforts have been stepped up recently with substantial donor support. While afforestation has been successful in some areas, the basic problem is the declining river flow because water is being diverted to enhance crop production.

Forest-based ecotourism

Forest-based ecotourism is another important service that is gaining prominence in many countries. In most West and Central Asian countries, where the scope for wood production is limited, recreational use could partly help to enhance the economic viability of forest management. International tourism has grown rapidly during the past few years (see Table 3.7) and the West and Central Asia region has increased its share in world tourism. There also has been a significant increase in domestic tourism in both subregions. In fact, in some countries domestic tourism provides a more stable income than international tourism. Both domestic and international tourism are expected to increase in the context of increased incomes

BOX 3.15

Human induced desertification is the Aral Sea

The Soviet practice of indiscriminately exploiting natural resources to feed its industrial machine had devastating consequences for the Aral Sea region. In 1959, the waters of Syr Darya and Amu Darya Rivers, the Aral Sea's two main feeders, were diverted to irrigate newly planted cotton fields in Uzbekistan. With the diversion of two of its feeding rivers, evaporation took its toll on the Aral Sea. Furthermore, the pesticides used to accelerate cotton growth heavily polluted the water system. Moscow's attempt to transform one of its republics into a major agricultural center was a shortsighted project and was abandoned within a decade. But the environmental effects were not so transient: the Aral Sea has lost three-fifths of its water in the past 40 years, and its shoreline has at some areas receded more than 60 miles. What remains of the sea is salty and polluted.

Source: Schaar, 2001.

and increased investments in infrastructure (for example, the revival of the Great Silk Road). Forests and forestry could significantly contribute to the growth in tourism. Countries such as Cyprus have been able to take advantage of the recreational use of forests, and have supported the overall tourism development in the country. In fact, wood production is becoming less important than the recreational use of forests (see Box 3.16).

There are, however, other countries in the West and Central Asia region where tourism still remains undeveloped even despite the presence of natural assets as, for instance, attractive landscapes, biodiversity, wildlife, and historical and cultural sites. The situation is expected to change rapidly for these countries, providing important opportunities for the forestry sector. Much will depend on moving up the value chain through investments in infrastructure and other facilities and enhancing the overall attractiveness of forest-based tourism (see Horak, 2004). A major issue related to the development of ecotourism is political stability and security. A study on the impact of the wars in Afghanistan and Iraq on ecotourism in Iran demonstrates the enormous fluctuation in the number of visitors to the country (Sakari and Vahabi, 2004) (see Box 3.17).

TABLE 3.7
International tourist arrivals in some countries of West and Central Asia *('000 people)*

Region	1990	1995	2000	2002	2003	2004
Central Asia	346	1 836	3 304	2 889	3 552	
Caucasus	190	1 113	1 294	1 533	1 980	
West Asia	13 306	19 829	31 289	40 716	41 121	47 016
Total West and Central Asia	13 306	20 365	34 238	45 314	45 543	52 548
Total world	**441 033**	**538 062**	**680 562**	**700 427**	**689 689**	**763 235**
Percent of world's tourists in West and Central Asia	3.0	3.8	5.0	6.5	6.6	6.9

Source: World Tourism Organization, 2005.

BOX 3.16

Tourism: A key objective of forest management in Cyprus

As Cyprus is becoming an important tourist destination in the Mediterranean, the significance of forests for wood production is declining and the environmental value for supporting the tourism sector is receiving more attention. This is particularly the case with privately owned forests. Direct dependence on forests as a source for wood has declined (especially as most wood is imported) and has led to lower incomes and negligence in forest management. However, tourism that is based on forests and other natural assets is growing rapidly and many forest owners have begun to manage "agritourism", taking advantage of forest benefits. The Forest Department is also changing its management approaches and increasingly tourism within the forestry sector is seen as an added attraction.

Several countries are competing to get a larger share of the tourism market, but only a few of them have been able to take advantage of the potential. Important strengths, weaknesses, opportunities and threats with regard to ecotourism are discussed in Table 3.8.

While the potential for forest-based ecotourism development is substantial, so are the threats and constraints. Political instability from conflicts in the region will remain a key problem. Where the conditions are favourable, management will have

BOX 3.17

Impact of wars in Afghanistan and Iraq on ecotourism in Iran

A four-year study in Guilan province in northern Iran assesses the trend in the number of visitors to the area, in particular for sport birds hunting (especially woodcock). In the survey, visitors clearly stated that security issues, especially stemming from the conflicts in Afghanistan and Iraq, were the major factors that prevented others from travelling to Iran.

Source: Sakari and Vahabi, 2004.

TABLE 3.8

Tourism in West and Central Asia – strengths, weaknesses, opportunities and threats

Strengths
• A wide range of ecological, social and cultural environments
• Rather unknown in comparison with other sites and therefore has some novelty
• Expansive wilderness, especially in some Central Asian countries
Weaknesses
• Poorly developed infrastructure (especially roads and other access) and hotels and facilities
• Cumbersome travel formalities, especially for obtaining a visa
• Conflicting objectives of the different agencies involved in tourism development
• Poorly developed institutional capacity
• Lack of information in potential markets
• Political conflicts and security concerns
• In some countries, tourism is generating adverse environmental impacts and has reached saturation stage
Opportunities
• Situated close to rapidly developing markets and the volume of tourism is expected to grow rapidly
• Increased interest for different kinds of tourism, focusing on local cultures and lifestyles
• Increasing incomes in the region may help to boost domestic and foreign tourism
Threats
• Political instability and frequent changes in institutions, which undermines consistency in management
• Unmanaged rapid expansion of tourism could undermine the basic resources – flora and fauna and the landscape – through congestion and environmental degradation
• Local communities may not be able to gain significantly from the growth in tourism
• Rapid growth of investments and very severe competition, which reduces the profit margins considerably

to address the problem of unmanaged and often very rapid expansion of tourism, degrading the very resource base. A typical example of this issue concerns the juniper woodlands in the Sarawat mountains in Saudi Arabia (Box 3.18)

Carbon sequestration

Sequestration of carbon is a key environmental service provided by forests and trees and thus their importance in mitigating climate change. Land-use changes (deforestation and afforestation) could significantly alter the carbon balance, changing what is retained in the biomass and in the atmosphere. In the context of the growing concern about climate change, there is some recognition on the potential of afforestation and reforestation for carbon sequestration.

The ratification of the Kyoto Protocol has opened the potential for investing in reforestation and afforestation under the Clean Development Mechanism. Although improved management of natural forests and all afforestation and reforestation projects help to sequester carbon, the use of the Clean Development Mechanism (CDM) to support afforestation and reforestation has a number of constraints. Primarily CDM is intended to allow industrialized countries to meet their greenhouse gas reduction obligations through offset projects in developing countries. It is within this context that the potential of the West and Central Asia region to sequester carbon and to generate funding for forestry is to be considered.

Carbon sequestration initiatives in the forest sector can be broadly grouped into two areas: externally funded afforestation and reforestation projects where carbon sequestration is one of the objectives; and projects within the framework of the CDM, driven by demand for credits – certified emission reductions – from private and public entities in developed countries. Within the West and Central Asia region, there are no afforestation and reforestation projects in the

BOX 3.18

Tourism in the Asir region in Saudi Arabia

On account of its favourable climatic conditions, the Asir region has become an important tourist destination in Saudi Arabia. Annually, between 2 to 3 million tourists visit Abha, the capital of Asir region, and its surrounding region; most of the tourism takes place from June to August. One of the more popular attractions in the Asir region is the juniper woodlands, which have been subjected to intensive recreational use. This has led to significant degradation of the trees in the family parks. During the tourist season, the influx of visitors is so excessive that park management is unable to enforce regulations. There is concern that the high numbers of visitors are changing the characteristics of the parks through soil compaction and, for instance, the cutting of tree branches – a factor predisposing trees to dieback. Changes in the overall appearance of the parks could significantly reduce the attractiveness of the region.

latter category, and what is now being implemented in some of the countries are primarily forestry projects where carbon sequestration is one of several, often incidental, objectives.

Recently, a pilot afforestation project funded by the Global Environment Facility (GEF) was initiated in Iran with the objective of carbon sequestration. The six-year project aims to demonstrate that desertified rangelands can be cost-effectively reclaimed for the benefit of the local community while at the same time benefiting the global community through carbon sequestration. The project has adopted a community-based approach by establishing village-development groups who take responsibility for managing afforested areas.

Studies have also been carried out on the carbon sequestration potential of afforestation and forest conservation in Kazakhstan. In the non-power sector, afforestation and reforestation are considered a priority area for carbon sequestration, and one of the objectives of the "Forests of Kazakhstan" programme is to increase the forest area to 5.1 percent (about 3.8 million hectares) by 2020 – from 3.7 percent (9.6 million hectares) in 1990. Annual carbon dioxide (CO_2) sequestration under this programme is expected to increase by about 6 million tonnes, with total investment estimated at about US$3.5 billion. Implementation of this largely depends on resource availability and institutional capacity.

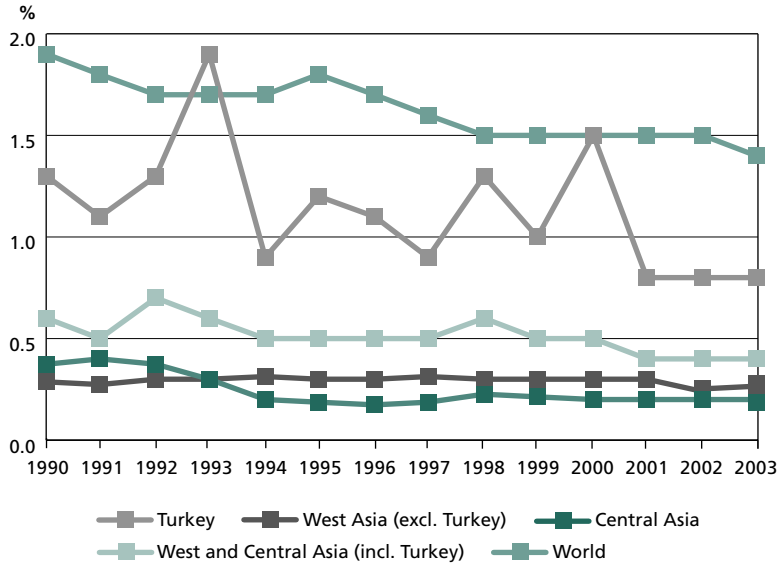
Although forests and woodlands are important carbon sinks, the scope for taking advantage of the CDM facility in the West and Central Asia region is limited. Most CO_2 sequestration projects now implemented in the region are outside the CDM framework, although there are a number of externally funded afforestation/ reforestation projects where CO_2 sequestration is accomplished incidentally. As such, the region does not have any CDM afforestation projects. Inherent low biomass productivity is a major limiting factor in taking advantage of the CDM facility. Because CDM is a market-based mechanism, most resources may flow to those countries that are able to sequester carbon more competitively. Low biomass productivity and the high costs of establishing plantations would make the cost of sequestration substantially higher. There are also a number of other stipulations that many countries may not be able to fulfill, not just for afforestation/ reforestation projects, but for all CDM projects.

ECONOMIC SIGNIFICANCE OF FORESTRY

Contribution to gross domestic product

In view of the low productivity of forests, the direct economic contribution of trees and forests to the national economies is negligible in most countries, except for Turkey and Georgia (Lebedys, 2004). Based on national income accounts, FAO has updated the long-term trends in the contribution of the forest sector to gross domestic product in the 1990-2003 period. In absolute terms, value added by the forestry sector increased in the region, mainly due to the expansion of the paper and furniture industries in West Asia. In 1990, value added generated by the forestry sector in the region was about US$3.5 billion and by 2003 this had increased to about US$4.0 billion. However, as Figure 3.4 illustrates, proportionately the share of

FIGURE 3.4
Contribution of the forestry sector to GDP: share of forestry, wood, pulp and paper, and furniture industries in gross value added



forestry has been on a long-term decline. This is nothing particular to forestry, but applicable to all other primary sectors, including agriculture.

Globally, the share of the forestry sector (including the furniture industry) declined from about 1.9 percent in 1990 to about 1.5 percent in 2003; the decrease was largely attributed to the faster growth of the other sectors. Within the West and Central Asia region, it declined from 0.6 percent in 1990 to about 0.4 percent in 2003. For reasons that are obvious, the share of the forest sector in West Asia is consistently higher than that of Central Asia; within West Asia, Turkey is a major player owing to its well-developed forestry sector, especially in the wood industries and pulp and paper sectors, which significantly contribute to its GDP.

Employment in the forestry sector

Analysis of national employment statistics indicates that in 2003 about 545 000 people were employed (full-time equivalent) in the forestry sector (excluding the furniture industry) in the region. Including the furniture industry, the total full-time employment in the region in 2003 was 620 000 people. Overall, the employment level in the forestry sector has remained stable in comparison with the level of employment in 1990 (when the total number of employees amounted to 628 000). The structural change within the sector is obvious – the number of employees in forestry has declined, but in other subsectors (industries) it increased. Figure 3.5 shows the number of persons employed (full-time equivalent) in the forestry sector.

In view of its relatively well developed forest industries, Turkey has a higher proportion of the labour force employed in the forestry sector in comparison with the rest of the region. In fact, Turkey accounts for 60 percent of the forestry sector employment in the region. Since the absolute number of people employed in the forestry sector has remained unchanged, the relative contribution of the sector to employment has declined over time (Figure 3.6). In line with global trends,

FIGURE 3.5
Trends in employment in the forestry sector (including furniture)

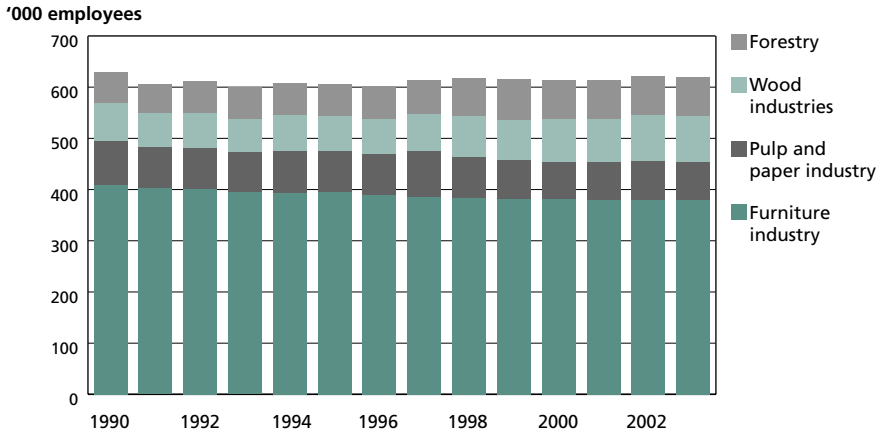
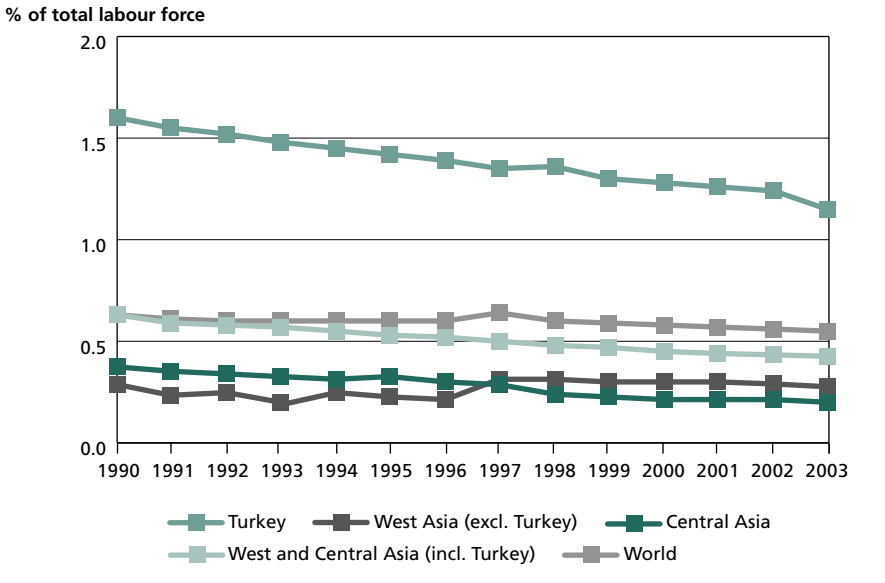


FIGURE 3.6
Employment in the forestry sector (including furniture)



forestry's share of employment in the region is declining. Although there has been some increase in employment in wood processing, the long-term prospects of such employment growth will depend on the availability of raw material (especially imports of industrial roundwood and sawnwood), growth in investments in wood processing and the nature of the technology adopted.

SIGNIFICANCE OF FORESTS AND WOODLANDS: AN OVERVIEW

Despite their low extent and productivity, forests and woodlands are important for their direct economic benefits, and more importantly, for the environmental services they provide. The following are some key aspects.

- Forest management for industrial wood production is limited to a few countries and most countries are dependent on imports to meet the demand for wood products.
- Fuelwood demand is declining, especially in view of the substitution with fossil fuels. However, in countries where access to fossil fuels is limited. it still remains the most important source of household energy for the rural population.
- Demand for charcoal is increasing because of increased urbanization and changes in lifestyles.
- There is an increasing recognition of the environmental functions of forests and woodlands. Of particular significance is their role in arresting land degradation and desertification, especially the protection of agriculture and habitations from sand encroachment.
- With the rapid growth of domestic and international tourism, the amenity values of forests and woodlands are being appreciated better. Several countries have stepped up their efforts to improve the urban environment by creating green spaces. In most countries, provision of such amenities will remain the most important function of forests and woodlands.
- While the direct contribution of forests and woodlands to gross domestic product and employment remains low (largely due to the small extent of forests and low productivity), the environmental benefits, although not quantified, remains important.

M. UEMOTO

Borjami-Kharagauli National Park, Georgia

4. Factors influencing forests and forestry

The forestry situation in the West and Central Asia region is influenced by a number of factors, both within and outside the sector, in particular how the various stakeholders respond to the changing opportunities. The state of forests and forestry reflects the overall state of societal development, what goods and services are required and how they are produced. Several factors directly and indirectly influence the evolution of the relationship between society and forests. Some factors affect the forest situation directly: these include forest cover, density, quality, production, demand for products and services. Other factors influence the forest indirectly through affecting sectors such as agriculture and industry. Broadly, the factors can be grouped into internal factors (pertaining to the situation within the country) and external factors (dealing with regional and global developments).

- Some key internal factors that influence forests and forestry are demographic changes, the pace of economic and social development, political and institutional evolution, environmental changes and developments in science and technology.
- External factors include the changes in geopolitics, global environmental concerns, shifts in competitiveness of countries and industries, and regional and global economic cooperation arrangements. The growing linkage among countries within the context of globalization affects the domestic situation in the countries. Many of the environmental issues are transboundary in nature and the actions or inactions in one country will have significant impact on others. Global changes in the forest sector, especially shifts in production, processing and trade, will also have important implications on the forest sector in the West and Central Asia region.

This chapter analyses the factors that will directly and indirectly influence the forestry situation in West and Central Asia in the next 15 years.

INTERNAL DRIVING FORCES

The most important internal factors in forests and forestry are:

- demographic changes;
- economic and social development;
- changes in policies and institutions;
- developments in science and technology.

Considering the complex nature of their impact, it is difficult to identify separately the cause and effect relationship of any one driving force. Within a given broad group, different components may have widely differing direct and indirect effects.

In addition, many of them are time dependent with a high probability of change, especially over a long-term period.

Demographic changes

Demographic changes significantly alter the demand for forest products and services and is, therefore, an important element influencing the long-term outlook. Table 4.1 summarizes the likely impact of key demographic variables on forests and forestry in the West and Central Asia region.

Population and its growth. Figure 4.1 illustrates population changes between 1980 and 2005 in the West and Central Asia region and provides estimates up to the year 2020 (specific country details of population changes are presented in the Annex, Table 4.1). Over the 1980-2005 period, the region's population grew from some 207 million to 361 million. Considering the projected average annual growth rate of about 2 percent, by 2020 the the West and Central Asia region will have a population of 487 million. However, as shown in Annex, Table 4.1, the size of the population and its growth rate differ considerably among the region's countries.

TABLE 4.1
Potential impact of demographic variables on forests and forestry

Demographic variable	Situation/direction of change	Potential impact on forests and woodlands
Size of population and its growth	Size of the population varies from less than 1 million to over 70 million in the region. Annual growth rate varies from negative to about 3.7 percent. But in view of the differences in the size of the population, the increase in absolute numbers is more important.	Depending on other factors, population growth will alter the demand for agricultural and forest products. Probable consequences include clearance of forest lands, increased collection of woodfuel and other forest products legal or illegal. Size of markets for wood and wood products and potential for economies of scale in processing industries. Availability of labour for forestry and forest industry. Decline in population tends to reduce pressure on land and other resources.
Urbanization	Proportion of urban population in the region varies from 40 percent to more than 90 percent. Urban migration is taking place at a much faster rate than population growth rates.	Reduction in direct pressure on land and forests. Changes in the pattern of demand (for example, changes in the demand for energy and the type of energy used). Increased demand for urban amenities (urban forestry) and recreational facilities. Shortage of labour for forestry activities.
Age structure	In many countries, the proportion of people below the age of 15 is high.	Increased demand for employment and better living conditions. Declining interest in traditional occupations, especially agriculture. Migration to other countries.
State of human resource development	Literacy rate and level of educational attainment varies considerably within and between countries	Availability of skilled and unskilled workers for forestry. Productivity and wage levels in forestry and forest industry. Ability to develop and adopt improved technologies. Awareness about the role of forests.

West Asia accounts for 80 percent of the population in the entire region, with six countries – Afghanistan, the Islamic Republic of Iran, Iraq, Saudi Arabia, Turkey and Yemen – having populations that exceed 20 million, accounting for 86 percent of the subregion's population (see Annex, Table 3.1). These countries also have the most forest and other wooded land in West Asia (in terms of total forest area). In Central Asia and the Caucasus, the two most populated countries are Uzbekistan (population exceeds 26 million) and Kazakhstan (14.8 million); together they account for 56 percent of the population in the subregion. The size of the population, combined with how it is dispersed (density, rural and urban distribution) and the economic situation will largely determine the likely pressure on land and forests.

The growth rate of the population is an important indicator of the potential future pressure on forests. Table 4.2 gives the variation in population growth rates in

FIGURE 4.1
Population changes in West and Central Asia

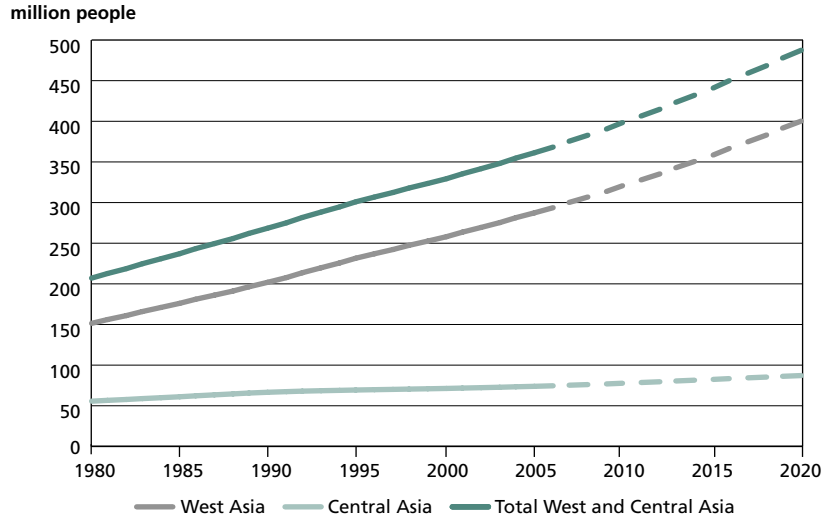


TABLE 4.2
Current and estimated future growth rate of population

Population growth rates	2000–2005	2005–2020
Negative	Armenia, Georgia, Kazakhstan	Armenia, Georgia
Very low (<0.5%)	–	Kazakhstan
Low (>0.5–1.0%)	Azerbaijan, Iran	Azerbaijan
Medium (>1.0–1.5%)	Kyrgyzstan, Tajikistan, Uzbekistan, Cyprus, Lebanon	Kyrgyzstan, Cyprus, Iran, Lebanon, Turkey
High (>1.5–2.5%)	Bahrain, Oman , Turkey	Tajikistan, Uzbekistan, Bahrain, Kuwait, Oman, Qatar
Very high (>2.5%)	Afghanistan, Iraq, Jordan, Kuwait, Qatar, Saudi Arabia, Syrian Arab Republicn Arab Republic, United Arab Emirates, Yemen	Afghanistan, Iraq, Jordan, Saudi Arabia, Syrian Arab Republic, United Arab Emirates, Yemen

Source: UN, 2005.

the region. The population in the Central Asian and Caucasus countries is growing at a low rate, with a projected growth rate of about 0.8 percent to the year 2020. However, within the region, the growth rates range from negative figures in Georgia and Armenia to about 2.3 percent in Tajikistan. Uzbekistan, the most populated country in the subregion, is expected to grow at a rate of about 1.7 percent to the year 2020.

In comparison, West Asia has a higher population growth rate, averaging about 2.1 percent, and by 2020 the population will increase by 113 million. Of the West Asian countries, the populations of Afghanistan and Yemen – two countries where the incidence of poverty is very high – are expected to grow at a rate of 3.5 and 3.7 percent, respectively. On the other hand, Iran and Turkey, the region's most populated countries, will experience a continuing decline in their growth rate.

Population density in relation to available arable land is an important factor that determines the pressure on land and forests. The region's average population density varies from 5 persons per km^2 in Kazakhstan to more than 1 000 per km^2 in Bahrain. The large extent of arid and semi-arid land suggests intense pressure on the limited arable land, as well as forests and rangelands. Such pressure becomes particularly intense in the absence of alternate income earning opportunities.

Urbanization. The extent of urbanization varies in the region: in West Asia 72 percent of the population live in urban areas, while in Central Asia and the Caucasus it amounts to 44 percent. Considerable differences exist in the current and future levels of urbanization. In some countries such as Bahrain, Kuwait, Lebanon, Qatar, Saudi Arabia and the United Arab Emirates, more than 80 percent of the population lives in urban centres. In contrast, Afghanistan and Yemen in West Asia and Tajikistan, Kyrgyzstan, Uzbekistan and Turkmenistan in Central Asia predominantly have rural populations, with over 50 percent of the population living in rural areas (Akerlund, 2005). The implications of high rural populations on natural resource use will vary depending on issues such as the availability of arable land, access to inputs (including technology) and markets (see Box 4.1). Urbanization will continue at a rapid pace, increasing the proportion of the urban population from about 58 percent at present to about 63 percent in 2020.

Urbanization will have the following impacts on forests and woodlands:

- Land use and its intensity will change as people move to urban areas and take up jobs in the non-agricultural sector. This has the potential to slow forest conversion and, in some cases, land abandonment has paved the way for forest regrowth (as with Cyprus).
- It could possibly reduce the demand for wood as a source of fuel, especially if cheaper commercial fuels become available and accessible. However, this depends on the relative prices of different fuels and the households' ability to pay. If cheaper alternative fuels are not available, urbanization could increase the demand for wood as a source of energy.
- Demand for wood and wood products is expected to increase because housing, commerce and trade are expanding. Demand has grown for

BOX 4.1

Rural population and land dependency

Among the Central Asian countries, Kyrgyzstan and Tajikistan will still have more than 60 percent of the population living in rural areas. In West Asia, Yemen will continue to be predominantly rural with about 66 percent of its population rural. Afghanistan will also be primarily rural. This suggests continued dependence on land and other natural resources, including forests and trees, especially for woodfuel and non-wood forest products. High population growth rates in some of these countries (for example Afghanistan, Tajikistan and Yemen) will exacerbate the problem of resource depletion, especially in the absence of alternative sources of livelihood outside the agricultural sector or if there are insufficient investments to improve agricultural productivity.

construction materials and has increased imports, especially in view of the limited domestic supplies.

- One of the outcomes of urbanization is the increasing demand for green spaces, especially for amenity and recreation. Most Central Asian and Caucasus countries have a long tradition of urban planning, inherited from Soviet times when green spaces were incorporated into city planning. Some cities in West Asia are also making substantial investments to improve the greening of the urban environment, including of Abu Dhabi, Bahrain, Dubai, Kuwait and Riyadh. The growth of tourism has further encouraged investments in urban greening.

Age structure. Age structure is another important demographic variable that influences land use and forestry, directly and indirectly. Table 4.3 shows the distribution of the population in the various age groups for the different regions.

With the exception of the Caucasus countries, the other countries in the region have more than one-third of their population in the age group 0 to 14. In some of the countries, for example Afghanistan and Yemen, it amounts to nearly half of the population. Among the Central Asian countries, Tajikistan has about 39 percent of the population in the age group 0 to 14. Issues such as human resource development and employment will become critical in the next two decades, when the younger group reaches working age. Some implications are:

- Depending on education levels and exposure to the rest of the world, the younger generation will have different perceptions than previous generations. In general, the interest in agriculture and other low-paying, strenuous occupations (including forestry) is declining. One of the outcomes of urban migration is that young people are reluctant to pursue agriculture and are keen to take up jobs in urban areas.

TABLE 4.3
Age class distribution of population

Region	Age 0–14		Age 15–65		Over age 65	
	% of population	Range	% of population	Range	% of population	Range
Central Asia	36	28–42	59	54–66	5	3–7
Caucasus	26	22–31	64	63–66	9	6–12
Arabian Peninsula	33	26–48	65	49–74	2	1–3
Other West Asia	36	23–47	59	50–66	5	3–11

Source: UN, 2005.

- However, there are countries where such opportunities are limited, resulting in continued dependence on land. The fragmentation of limited arable land causes farm incomes to decline and poverty to persist. Forest products, especially woodfuel and non-wood forest products, are often collected illegally and become an important source of income.
- Providing remunerative employment will be a major problem in countries with high urbanization. Many governments, particularly in the oil-producing countries, that have been dependent on expatriate staff increasingly want to reduce such dependence to enhance employment opportunities for local people. Largely, this hinges upon investing in human resource development. The lack of attractive and productive employment often has led to social instability and the emergence of extremism, which have serious consequences including undermining development.[4]

Human resource development. Recent studies have highlighted the critical situation regarding the state of human development in the region (UNDP, 2005a, 2005b). In addition to some of the traditional components such as the literacy rate, life expectancy at birth and infant mortality, others such as women's participation in work and the enrolment in secondary and tertiary levels of education provide a general overview of human resource development. Apart from a few countries such as Afghanistan and Yemen, many countries have been successful in improving literacy and life expectancy and reducing infant mortality rates. In this they are more successful than the global average and substantially surpass the developing countries. In many Central Asian and Caucasus countries, however, the situation has somewhat deteriorated in the post-Soviet years. The level of women's participation in economic activities varies considerably, but generally in many of the countries women's participation is limited, although there are indications of change.

Improved access to information, especially facilitated through the developments in communication technologies, is bound to change the situation and many

[4] As discussed in Chapter 3, several countries in the region have substantial potential for tourism development. However, security and political stability are key factors for the growth of tourism. Recent years have particularly witnessed extremists targeting the tourism industry as a means of destabilising the economies.

governments are investing more on human resource development. The empowerment of women is receiving particular attention, and a number of countries have changed their constitutions enabling women's participation in public life. The situation in the next decade and beyond is bound to change.

Overview of the impact of demographic changes. The influence of demographic changes on forests and rangelands will largely depend on the interaction with several other factors. In many countries, the population density in relation to arable land is extremely high. Several countries – especially in the Arabian Peninsula and in Central Asia and the Caucasus – derive a major share of their income from extracting, processing and trading fossil fuels and are less dependent on land as a source of income. At the other end of the spectrum, however, are those countries with limited arable land and high population densities, high proportion of rural population, high proportion of people in the younger age group and limited investments in skills. Unless there is substantial investment in improving human skills and capabilities, the extensive use of land is likely to continue to have adverse impact on forests, woodlands and rangelands.

Economic changes

Economic changes include several interlinked elements, but those that most influence forests and forestry are the growth and distribution of income (which determines the level of poverty) and the structural changes in the economy (which determines the shifts in the source of income). Table 4.4 discusses the nature of their impacts.

Gross domestic product. With regard to national income, the West and Central Asia region is relatively better off in comparison with other developing regions. However, although the region accounts for about 6 percent of the world's population, its share in the total global domestic product is only about 3.3 percent. In 2004, the per capita GDP for the region was around US$7 200 (see Annex, Table 7). Much of the region's prosperity comes from the exploitation and processing of oil and natural gas and the related investments in industries, infrastructure, trade and other related services. In the post-1980 period, the pace of exploitation of oil and natural gas has increased enormously and so has economic growth (Figure 4.2). This trend is likely to continue as long as oil prices remain high.

An exception to the general upward trend is with the Central Asian and Caucasus countries, as their incomes declined significantly after they became independent, with some of them still yet to attain the pre-independence income level. In 2004, only Armenia, Azerbaijan, Kazakhstan and Turkmenistan had per capita incomes that exceeded 1990 levels, all other countries remained below the 1990 levels. However, there are signs of recovery, especially for those countries having large fossil-fuel reserves.

Long-term growth prospects of the economies. The prospects for economic growth in the long term will vary depending on the level of investment, productivity and

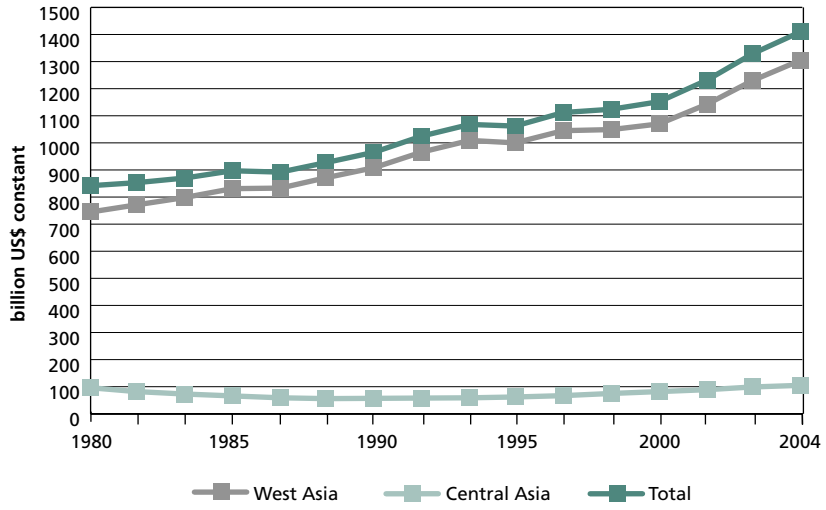
TABLE 4.4
Potential impact of important economic variables on forests and forestry

Economic variable	Situation/direction of change	Potential impact on forests and woodlands
Gross domestic product and its growth	Size of the economy and per capita income varies enormously in the region. The three largest economies are Turkey (US$300 billion), Saudi Arabia (US$250 billion) and Iran (US$160 billion). Several countries have GDP between US$10 billion and $20 billion. The growth rate of the economies also varies and in recent years some of the economies have registered rapid growth, often through exploitation of petroleum and natural gas resources.	Demand for wood and wood products and size of markets Potential to raise tax income by governments and investing in forestry Household demand for wood and wood products
Per capita income	In 2004, the per capita income for the region was US$7 231 (US$ 3 860 for Central Asia and US$10 601 for West Asia). Within each of the subregions there are significant differences in per capita income, e.g. about 6 times between Tajikistan and Kazakhstan and 25 times between Yemen and Bahrain.	Demand for environmental services (especially recreation) from forests and the willingness and ability to pay for such services. Willingness to invest in conservation and management of forest and tree resources.
Income distribution and poverty	Income distribution is highly skewed in most countries. Along with low incomes, this results in high levels of poverty in many countries. Rural poverty often results in high dependence on natural resources (especially for woodfuel, fodder, timber and non-wood forest products) for domestic consumption and for income-generation.	High potential for poverty-related illegal collection of forest products Inability of farmers and other resource managers to invest in sustainable resource management
Structural changes in the economies	While the economic significance of the primary sectors is declining in a number of countries, agriculture and animal husbandry remain important in some countries resulting in land-use pressures. Many countries have diversified their sources of income with significant decline in the contribution of agriculture and animal husbandry.	Reduced pressure on land and in some cases abandonment of agriculture as a result of shift from primary-sector activities, creating potential for regrowth in forests Declining dependence on traditional occupations, especially agriculture

competitiveness of the countries in producing goods and services for the domestic and global markets (see Box 4.2). While some of the countries are expected to grow rapidly, others might continue to lag behind because of several factors. The overall situation in the region can be categorized as follows:

- Several countries in the region (for example, Bahrain, Iran, Iraq, Kuwait, Oman, Saudi Arabia, Turkmenistan, United Arab Emirates and Uzbekistan) are highly dependent on income from extracting, processing and trading of fossil fuels. Although there is considerable volatility, oil and gas prices are unlikely to decline dramatically in the foreseeable future, especially in view of the growing demand from emerging economies such as China and India. Recent increases in oil prices could boost the investment in alternative sources of energy, including renewable sources, but the primacy of oil as a source of energy is unlikely to diminish in the next two decades. This suggests that the economic growth of oil producing and processing countries will remain at a high level, barring conflicts and political instability.

FIGURE 4.2
Real GDP change in West and Central Asia



BOX 4.2
Investment and economic growth in West Asia

Key factors that affect economic growth are gross investment, physical capital formation and efficiency. Between 1975 and 1998, the rate of gross investment (gross fixed capital formation relative to GDP) was on average 24.6 percent of the gross domestic product. On the whole, there has been a long–term decline in gross investment for the West Asian countries, declining from about 27.3 percent during 1975–1980, 25.1 percent during 1980–1990, and 21.9 percent during 1990–1998. Another factor is the efficiency of the use of capital or productivity, as reflected in the incremental capital output ratio. In general, the incremental capital output ratio is high for most countries. Studies hitherto indicate very low labour productivities. All these factors show that long–term prospects for growth largely revolve around oil prices, and for the countries with limited oil income the prospects are less optimistic.

- Many countries have diversified their economic base and have made significant investments in developing their industrial and services sectors. Specifically, a number of oil-producing countries, which include Iran and the United Arab Emirates, are reducing their direct and indirect dependence on oil revenues. In Central Asia, Kazakhstan is another country that is focusing on developing a diversified economic base (see Box 4.3). Other countries that have succeeded in diversifying their economies are Cyprus, Lebanon and Turkey. The prospects of economic growth largely depend on their global competitiveness.

- There are a number of countries that have neither the critical resources like fossil fuels nor a diversified economic base and hence they will continue to be dependent on agriculture and animal husbandry. Low income has also discouraged investment in human capital. The prospects for rapid economic growth may, therefore, be somewhat uncertain. Even if economic growth is rapid, forestry is unlikely to attract investment in view of other priorities.

Income distribution and poverty. Although relatively the region is better off economically compared with other regions, poverty is still widespread in several countries and largely results from low incomes and its skewed distribution. Household income studies reveal that the share of 20 percent of the low-income groups in the GDP is only 6 percent, while the share of 20 percent of the high-income groups amounts to 49 percent. This income disparity means continued pressure on natural resources, including forests and tree resources.

The discontinued state involvement in economic management after the Soviet Union disintegrated caused significant increases in income inequalities in the Central Asian and Caucasus countries. Market-oriented policies and institutional reforms in the post-Soviet period resulted in privatization of state enterprises. However, in the absence of an effective institutional framework to oversee the process and to safeguard public interest, privatization has often led to the enrichment of the few with consequent increases in income disparities. It has particularly affected the forest sector, especially because poor people have become more dependent on forests and trees.

Structural changes in the economy. Structural changes, especially the shifts in the relative importance of different economic sectors, in particular the share of agriculture (including animal husbandry) in income and employment, are critical

BOX 4.3

Kazakhstan: the next Asian tiger

Kazakhstan's GDP has consistently been growing in excess of 10 percent per annum over the last five years, and the country now stands at the vanguard of the next generation of Asian tiger economies. The current growth in oil and gas prices undoubtedly helps to bolster an already burgeoning economy, but the windfall in petrochemical dollars is by no means the whole story to Kazakhstan's economic miracle. Kazakhstan has attracted more per capita foreign direct investment than any other country in Asia and Eastern Europe. It has diversified its economy and reinvested oil and gas income in a number of key sectors. Further, there have been significant efforts to link up with the high-performing economies, especially China. With the revival of the Silk Route, Kazakhstan is positioning itself to become the most important land link between China and Europe.

to understanding agriculture-forest issues. Although agriculture value added in the GDP of the West and Central Asian countries varies enormously (see Box 4.4), the overall trend is towards reducing its share, especially as other sectors (extraction of fossil fuels and minerals, industries and services) expand (FAO, 2005). The agriculture-forest interaction in the region will be determined by the following:

- The preponderance of drylands would suggest that future agricultural extension will be largely determined by investments in irrigation infrastructure. The acute water deficit in the region and the complexity of water-sharing arrangements underscore the difficulties in expanding irrigation. There may be some exceptions, as for example Kazakhstan's substantial unused arable land or agricultural and livestock policies that have adverse consequences on forests and woodlands (see Box 4.5).
- Government subsidies will be another element that will impact agricultural expansion in the region. A number of countries that had earlier strongly supported agricultural development through direct and indirect subsidies are now reviewing them and in some cases have either repealed subsidies or reduced them. Increasing market-oriented policies and removal of subsidies make agriculture unviable. Agricultural subsidies in other regions (especially Europe) and market access limitations also negatively affect the competitiveness of agricultural production in many West and Central Asian countries. Future expansion of commercial agriculture in the West and Central Asia region will, to some extent, depend on issues such as input prices, productivity and competitiveness and, particularly, the agricultural policy changes in Europe and other regions.
- The mobility of people and rapid urbanization are important factors that could reduce the importance of agriculture. Limited income opportunities will encourage more young people to migrate to urban areas, and as a result agriculture could continue to decline.

BOX 4.4

Importance of agriculture in West and Central Asian economies

In the West Asian region, the share of agriculture value added in GDP varies from less than 1.0 percent in Kuwait to over 22 percent in the Syrian Arab Republic. The share of agriculture value added of Turkey and the Islamic Republic of Iran, the two most populated countries in the region, is 13.8 percent and 18.6 percent respectively. Countries in Central Asia and the Caucasus have a much higher share of agriculture value added in their GDP, ranging from 9 percent for Kazakhstan to more than 37 percent for Kyrgyzstan. For several countries, for example Armenia, Tajikistan and Turkmenistan, the agriculture value added exceeds a quarter of the GDP.

Source: FAO, 2005.

BOX 4.5

Changes in agriculture and animal husbandry in Saudi Arabia

Over the past four decades, Saudi Arabia has witnessed important changes in the agriculture and range societies. New employment opportunities have changed occupations. Some of the changes that have affected forests and range conditions include:

- Easy transport of livestock to rangeland areas and the provision of water transported over long distances led to very intense browsing, leaving little scope for the system to recover;
- New job opportunities encouraged many people to leave their traditional occupations. Expatriate workers have taken their place and do not have any knowledge on ecological conditions and other matters.
- Herders have increased the size of their herds to counter the increases in production costs. Thus, although the nomadic population declined during the 1990s, the number of livestock has increased.

Source: FOWECA country outlook paper, Saudi Arabia.

Key economic drivers: an overview. The overall economic situation influences forests and forestry, primarily through the following:

- Income growth in the region will vary and so will its distribution, affecting the different actors' ability to invest in forestry and the demand for forest products and services. In a number of countries, high dependence on land and other natural resources will persist and low incomes will discourage investment in forest management.
- Even when government and other players are able to derive substantial income, forestry may not receive priority attention. In the early stages of economic growth, most efforts tend to be directed to improving social and physical infrastructure – health, education, transport – with forestry receiving little attention. Even when income increases, the initial investments tend to focus on activities that generate higher returns, and forestry may not be a priority area. For example, some of the countries are witnessing a boom in real estate investment and even with the high liquidity, forestry is unable to attract investments. Often the increased investment in real estate has resulted in clearing forests and woodlands close to urban centres.
- The long-term prospects of forests and forestry largely depend on structural shifts in the economy and, in particular, the extent of reliance on agriculture and animal husbandry for income and employment. There are some countries, Cyprus for example, where structural shifts have reduced the pressure on land permitting forest recovery.

In many countries, therefore, investments in the forest sector are likely to remain low, even when the economic situation improves. The low incomes in some countries of the region perpetuate continued dependency on agriculture, animal husbandry and forests. At the same time, low income also limits the ability to invest in sustainable management, resulting in resource depletion.

Political developments, policies and institutions

Political and institutional changes fundamentally affect natural resource use patterns as they influence the actions and responses of people. The West and Central Asia region has witnessed profound political changes in the last two decades. The collapse of the Soviet Union and the independence of countries in Central Asia and the Caucasus is one of the most important developments. Although slow and chequered, West Asia is also undergoing political changes with democratic arrangements establishing roots in the countries. These changes affect policies and institutions altering people's interaction with natural resources. Important developments that need to be considered in assessing the long-term outlook for the forest sector include:

- political changes, especially the emergence of democratic governments;
- decentralization and community participation;
- involvement of the private sector in resource management;
- role of civil society organizations in influencing policies in the public and private sectors.

Political changes and empowerment. The political environment in a country is a fundamental element influencing almost everything and, therefore, is important in assessing the future of the forest sector. The West and Central Asia region is characterized by a wide spectrum of political systems, ranging from governments elected through democratic processes to authoritarian governments. Changes, although sometimes slow, are already under way resulting in greater involvement of people in governmental decision-making (see UNDP, 2002). The collapse of the Soviet Union has ushered a major change in Central Asia and the Caucasus, although the transition is far from complete and centralized systems of government persist in a number of countries (see Box 4.6).

Several countries in West Asia have already embraced democratic processes and increasingly this is expected to have an impact on natural resource management. Improved access to information tends to catalyse change, creating the necessary conditions to broaden participation. Changes will occur more rapidly in countries that have a high proportion of young people, whose values and aspirations will be different. All the indications point to continued political changes in the region (Box 4.7), paving the way for the public to have an increased role in decision-making, including in the management of natural resources. Policies and legislation within and outside the forest sector are already changing as a result of broader political changes and continued efforts in this direction will have a significant impact on forests and forestry (see Box 4.8).

BOX 4.6

Political transition in Central Asia and the Caucasus

In the early 1990s, despite the collapse of the socialist system in the region, there was poor public understanding of alternative political, economic and social arrangements. The understanding of democracy was translated into free elections. Other essential attributes of democracy such as the rule of law and strong civil society remained less developed. This political vacuum was rapidly filled by a centralized system of governance. The majority of the first presidents of the newly emerged states were former communist rulers. The initial changes in governance systems were very slow as the new leaders maintained that transition to a democracy and market economy needed to be gradual. According to the leaders, the public in general was not ready for rapid reforms and therefore a typical top-down approach prevailed.

Source: Osepashvili, 2005.

BOX 4.7

Political participation in Arab countries

Political participation in Arab countries remains weak, as manifested in the lack of genuine representative democracy and restrictions on liberties. At the same time, people's aspirations for more freedom and greater participation in decision-making have grown, fuelled by rising incomes, education and information flows. The mismatch between aspirations and their fulfilment has in some cases led to alienation and its offspring – apathy and discontent. Remedying this state of affairs must be a priority for national leaderships.

Source: UNDP, 2002.

Decentralization and community participation. Increased community participation in resource management is an outcome of broader policy and institutional changes and still is in the early stages of development. Almost all countries have had a long history of community-level arrangements for resource management, especially in the use of pasturelands. However, such traditional arrangements have not been sustained because of several factors, including the inability of community management systems to adapt to changes as well as government policies. This has been particularly true in Central Asia and the Caucasus in the context of centralized planning and collectivization of farming and animal husbandry implemented during the Soviet period.

BOX 4.8

Legal framework for public participation in forest management in Central Asia*

All the countries have their legal framework for the forest sector revised in the 1990s with varying degree of indications towards a market economy. Armenia, Azerbaijan, Georgia, Tajikistan, Uzbekistan and Kyrgyzstan define the forest resources exclusively as state property. The management responsibility may be divided between different central-level state agencies and in some cases local government and/or state enterprises. ... In Tajikistan, degraded pasturelands (with potential for tree planting) are being transferred to non-state parties. In Kyrgyzstan and Uzbekistan community forestry experimented to very limited extent through long-term leases of state forest lands.

Source: Savcor Indufor, 2005.

* Note: Kazakhstan and Turkmenistan were not covered in the study.

The Central Asian and Caucasus countries have three basic levels of governance: central, regional and local (district, city and village administrations). Local representative bodies – councils – are normally elected, while heads of regional and local administrations – executives – are directly appointed by central governments. The interaction between the central, regional and local governments is predominantly hierarchical, as nearly all political and economic decisions, including those which are of local importance, are made at the national level (Osepashvili, 2005). Although many governments have expressed their intention to shift greater rights and responsibilities to local authorities, these are yet to be translated into action. Often the transfer of responsibilities has taken place, but the authority and the resources have not.

With the exception of Cyprus and Turkey, initiatives to involve local communities in the management of forest and tree resources in West Asia are limited. The Forest Village Cooperatives in Turkey, established in accordance with the Forest Villages Development Law 2924 (1983), is a notable effort (see Box 4.9). The role of village cooperatives is primarily for harvesting wood; otherwise, they have little say in how forests are to be managed or in the prices of forest products. Changes are, however, expected with Turkey's likely joining in the European Union.

Apart from policy and institutional issues, resource constraints will continue to limit community involvement in forest and tree management, especially because of low productivity and income derived from forests and the preponderance of non-marketed benefits whose provision needs to be met collectively. Poor communities may find this particularly difficult and would require financial, technical and managerial support from governments and other organizations to pursue participatory approaches.

BOX 4.9

Village cooperatives in Turkey

In Turkey, there were 4 948 Agricultural Village Cooperatives with 684 936 members, of which 3 199 villages were forest villages by the end of 2001.

Forest Village Cooperatives have been given special rights and privileges through forest laws since the 1970s. Forest Law Article 40 stipulates that Forest Village Cooperatives have priority in getting timber production jobs, which is in accordance with the management plans of the State Forest Organization. The villagers or the Village Development Cooperatives are paid according to the unit prices set forth. Article 34, amended in 2000, stipulates that in addition to labour payments, a premium of 10 percent is to be paid in wood-harvesting works and that 25 percent of the logs carried to the depot should be sold to the Cooperatives at 20 percent less than the average auction price. These legal rights have been providing additional opportunities for incomes and significant benefits to villagers through their cooperatives.

According to the records of the General Directorate of Forestry, cooperatives and villagers were paid TRL175 trillion for wood-harvesting operations in 2002. In addition to this amount, TRL19.5 trillion was paid to the cooperatives and villagers on the basis of other legal rights.

Based on the information of the General Directorate of Forestry, about 287 000 members of the 2 100 Village Development Cooperatives were involved in forest products harvesting operations in 2000. It was estimated that about 60 percent of the total wood production was carried out through the cooperatives during the period.

Source: FOWECA country outlook paper, Turkey.

Development of the private sector. Following the transition from centralized planning, a number of countries in Central Asia and the Caucasus have promoted private-sector involvement in key economic sectors. While state assets and enterprises have been privatized to some extent, the pace and the outcome of these efforts have varied. In many cases, privatization in its true sense has not been implemented, especially one that adopts a competitive process for enhancing efficiency (see Box 4.10). Private-sector involvement in forestry, especially in forest management (see Annex, Table 8) has been limited for the following reasons:

- low productivity and high costs reduce the rates of return in comparison with alternative investment options;
- most benefits from forests and trees in the region are public goods, particularly the environmental services. Markets for such services are non-existent or poorly developed, and hence there are no incentives for forest owners to manage forests.

In West Asia, countries like Cyprus and Lebanon have a long history of private ownership of forests and woodlands. In Cyprus, more than 38 percent of forests

BOX 4.10

Turkmenistan and Georgia: contrasting economic systems

Turkmenistan has been very conservative in terms of economic reforms. Privatization has been virtually halted since the mid-1990s. State investment amounts to around 30 percent of the GDP, mainly covering oil, textiles, food processing, transportation and construction. The services sector has been mostly privatized and currently the private sector controls 90 percent of the retail trade. In contrast, the state share in industry is more than 80 percent, while medium- and large-scale enterprises remain in state hands. These enterprises are subject to mandatory state plans. The supply of basic commodities such as water and natural gas is either free or heavily subsidized. The tight state control of the economy and the lack of transparency severely restrict private investments.

In Georgia, Structural Adjustment Programs have been implemented by the International Monetary Fund and the World Bank since the mid-1990s. The associated measures have included privatization, price liberalization, cutting social expenditure and freezing wages. Though painful, these measures helped to overcome the problems of inflation and economic stagnation. Privatization in the early 1990s was poorly organized and non-transparent. After 2003, the new government has accelerated the economic reform and restructuring process. This includes selling some of the state-run strategic enterprises, such as mining enterprises and metallurgical plants, the simplification of the tax code and removal of excess bureaucracy.

Source: Osepashvili, 2005.

and over 76 percent of other wooded land are privately owned; however, the small size of the holdings and absentee ownership have led to the neglect of management. In many cases, private forests and woodlands are enclosures within government forests that have been abandoned by owners. Privately owned forests in Lebanon consist mainly of pine forests managed for the production of pine nuts.

One area where substantial change in ownership and management has taken place is in the processing and marketing of wood and wood products. Private-sector participation largely depends on the overall investment climate and issues such as markets and input prices. As economies are liberalized and private-sector involvement encouraged, foreign direct investment in processing and marketing of wood and wood products is expected to increase in some of the countries in the region largely based on their perceived competitiveness. Turkey and Iran seem to have taken advantage of this opportunity, especially in the production of panel products and furniture. Large domestic and regional markets, availability of skilled and unskilled workers, good transport networks and ability to mobilize investments internally are some of the competitive advantages of these countries.

Looking ahead, major changes are not anticipated for involving the private sector in wood production, even if favourable policies and legislation are

introduced. Low productivity stemming from the harsh growing conditions will remain a major constraint. Even where private ownership is well established, as in the case of Cyprus, there are few incentives for investment in wood production because of the small size of holdings and the higher returns from alternative investments. Some of the potential areas for continued private-sector involvement in the region will be:

- Management of recreation areas in forests, especially for the provision of various amenities. In fact, the rapid growth of tourism in the region would necessitate that appropriate public-private partnerships are developed to take full advantage of the recreational potential, ensuring that such arrangements sustain the environmental and social values.
- Production and processing of high-value non-wood forest products. This is another area where there is further scope for private-sector involvement. The West and Central Asia region has a wealth of medicinal plants with substantial potential for systematic cultivation and value addition.
- Private tree planting under agroforestry, although limited in scope. Largely multiple-use trees will be planted, mostly for providing environmental services (especially as windbreaks and shelterbelts), but also for meeting local needs (primarily small timber, fencing materials and woodfuel). Encouraging such efforts would require creation of favourable policy and legal frameworks and improvement of institutional arrangements.

Emerging role of civil society organizations. The state of development of civil society organizations and their involvement in forest-related issues varies among the countries in the region and largely reflect the overall political and social environment. In many countries, there are rigid rules regulating NGOs and often they are unable to act independently. Some of the main functions of NGOs include:

- creating public awareness on environment and forestry issues through education, publicity, etc.;
- implementing research and other studies relating to forestry issues;
- undertaking development tasks on behalf of national and international organizations;
- functioning as pressure groups to bring about changes in policies, institutions, programmes and activities.

In general, most NGOs focus on the first three tasks, often with support from governments and international agencies. The impact of NGOs largely depends on the overall political environment, the support they receive from the public and their technical, organizational and financial capabilities. While there are some examples of effective civil society organizations, the overall situation needs substantial improvement (Box 4.11).

Given the broad trend towards more open political processes and increasing public awareness about environmental issues, NGOs are expected to play an increasing role in addressing forestry and environment-related issues in the region. Improved access to information resulting from the growth of information and

BOX 4.11

State of civil society development in Arab countries

Civil society faces the same problems as the political community vis-à-vis the authorities who seek to control civil organizations, directly or indirectly, by a dual strategy of containment and repression. In addition, many CSOs [civil society organizations] become extensions of political parties, which use them as fronts through which to expand their political influence at the popular level. This, in turn, limits the CSOs' initiative and independence of action. Consequently, civil society organizations have not been significant actors in resolving the existing political crisis, as they too have been caught up in its vortex.

Source: UNDP, 2005a.

communication technologies will further enhance the role of NGOs. However, many will continue to depend on the support from governments and international organizations with their attendant constraints of sustainability and freedom. Nevertheless, increased civil society initiatives could "internationalize" some of the local and national issues.

Conflicts and insecurity. The West and Central Asia region is prone to conflicts, mostly arising from the competition for critical resources – especially energy and water – and the political and institutional environment that often fails to recognize the aspirations of people from diverse ethnic, religious and linguistic backgrounds. There are several areas where conflicts have particularly affected forests and forestry. For example, insecurity in some of the forested provinces in Afghanistan has virtually prevented any management (see Box. 4.12), and has reported to be an important factor contributing to large-scale illegal logging. Conflicting claims between Armenia and Azerbaijan on the vast tracts of forests and other land bordering the two countries have led to the absence of management of these areas. Georgia also faces similar problems with some of its forests. Similarly, extensive areas of tree growth have been destroyed in Iraq. Conflicts impact forests and forestry by:

- diverting government resources from developmental activities, including forest management;
- weakening institutions, creating favourable conditions for illegal removal of resources such as fuelwood;
- inhibiting long-term investments.

Improvements in the management of natural resources will depend on how these conflicts are resolved. There are considerable uncertainties in this regard, especially in view of the chequered development of democratic governance and a host of external factors.

BOX 4.12

Afghanistan – instability and a weak institutional framework

Situated in the North-East along the border with Pakistan, the Kunar forest is one of the last remaining forests in Afghanistan. It is believed that half of this forest's viable stocks have been stripped by timber mafias and shipped to Pakistan for export to the Gulf and Europe. Before the fall of Taliban, who somehow controlled the deforestation activities in Kunar – and profited from its products – had at least limited the exploitation.

The current interim authority is now powerless to stop the unrestrained logging as the perpetrators are protected by tribal and political warlords, who run much of rural Afghanistan. One of the efforts made by the new government in March 2005 was to form the "Green Division", an armed and trained contingent of 300 forest rangers with the goal of protecting Afghanistan's forests from timber smugglers. The rangers function under the Ministry of Interior, which expects to increase the division's manpower to 2 000 rangers by the end of 2006. Scepticism surrounds the effectiveness of these efforts as some cite that corruption of the police and high-ranking local officials will render them useless. Others have noted that the government has neither the budget nor the equipment to support the division".

Source: Nasrat and Babak, 2005; Wafa, 2002.

Technological changes

In assessing the long-term scenarios of development, it is important to consider the role of technological changes and how they may influence forests and forestry in the region. In addition to the developments in the field of information and communication technologies, some key areas to be considered are the efforts to enhance efficiency in the use of water and energy. Most countries in Central Asia benefited significantly from the large science and technology infrastructure of the Soviet Union. Research and development (R&D) efforts in the former Soviet Union were entirely in the public sector. With the collapse of the Soviet Union, the scientific capacity of these countries significantly decreased. Limited resources, persistence of a top-down approach to research and development, and loss of competent scientists through emigration continue to affect the overall science and technology capacity in the Central Asian and Caucasus countries.

Although the West Asian countries have a different historical background, science and technology development does not differ greatly among the countries, except for a few such as Iran and Turkey. Table 4.5 provides a general indication of the overall situation with regard to important technology parameters.

It has to be noted, however, that the data of the number of researchers in Central Asia and the Caucasus may be distorted, as it partly reflects the pre-independence era. The R&D expenditure for the period 1997-2002 provides a better indication of the situation. None of the countries in the region have R&D spending that matches

TABLE 4.5
Indicators of innovation and its diffusion

Country	Average no. of researchers in R&D 1990–2003 (per million people)	Average R&D expenditure 1997–2002 (% of GDP)	Internet users 2003 (per '000 people)
Central Asia and Caucasus			
Georgia	2 317	0.3	24
Armenia	1 606		
Azerbaijan	1 248	0.3	
Kazakhstan	744	0.3	
Kyrgyzstan	413	0.2	38
Tajikistan			1
Uzbekistan			19
West Asia			
Jordan	1 977		
Cyprus	569	0.3	337
Iran	484		
Turkey	345	0.7	85
Kuwait	73	0.2	228
Syrian Arab Republic	29	0.2	35
United Arab Emirates			275
Bahrain			216
Lebanon			143
Saudi Arabia			67
World average	**1 146**	**2.5**	**120**
Developing country average	**400**	**0.9**	**53**

Source: UNDP, 2005a, 2005b.

the world average, or for that matter even that of the developing countries. As for Internet usage, several countries in West Asia have a much higher proportion than the world average. While this example is a crude index of improved access to information, it also reflects the higher disposable income of the population.

Research and development in forestry and allied sectors. Since most of the countries allocate a small portion of GDP to R&D, their ability to address emerging problems remains constrained. Because forestry is given low priority, as the attention is focused on protection and conservation, the share of resources allocated for forestry research is insignificant. Key technical issues that forestry needs to continue addressing are:

- improving afforestation techniques, especially in extremely unfavourable environments, including highly toxic soils;
- enhancing the efficiency in water use for afforestation and reforestation and in urban planting, as well as further improvements in the use of wastewater for irrigation;
- processing technologies for non-wood forest products.

There are several other potential areas for technology improvement in the forestry sector. Remote sensing is expected to improve significantly to facilitate real-time monitoring of forest and tree resources and assessment of degradation and desertification. Improved techniques for controlling desertification, especially biotechnology applications to enable plants to withstand water scarcity and soil toxicity, will be particularly important to the West and Central Asia region as a whole. Other technological developments that may have immediate influence would be improvements in fire detection and the control and management of pests and diseases. While developments in these areas could have a significant impact on the forestry situation, this depends on the creation of necessary conditions for increased investments in R&D and overcoming a number of constraints in the wider adoption of available and emerging technologies.

EXTERNAL ENVIRONMENT

An important factor that will influence the overall social, economic and political environment in the West and Central Asia region, and thus indirectly forests and forestry, is the regional and global economic and political situation, in particular the pace of globalization and the changes in global geopolitics. The entire region, in particular the fossil fuel rich countries, is subjected to divergent pressures that arise from the intense competition to gain access to energy resources. Globalization is another dimension of the external environment that is altering the global economic geography, and has resulted in the emergence of new global players and the consequent shifts in trade and investments.

Globalization

The pace of globalization has increased rapidly during the past two decades, enhancing the mobility of capital, technology, information and products across national borders. Countries are more closely linked now than they were before, and what happens in one country significantly influences other countries, even though geographically they may not be close. The region's importance in the globalization process stems from its vast reserves of oil and natural gas. The pace of investment in the oil and affiliated infrastructure sectors is expected to continue and some of the countries in the region are emerging as regional and global centres of commerce and trade. Whether the benefits of such developments will be widespread or whether globalization will be an asymmetrical process, benefiting only a few, is a major concern.

An important element in the process of globalization is the global and regional economic cooperation and trade agreements. Eleven of the countries are members of the World Trade Organization, and of the ten observers some such as Saudi Arabia are about to become full members. Currently, the Syrian Arab Republic and Turkmenistan are the only countries that are not members or associated with the World Trade Organization as observer member government. Negotiations on trade, especially relating to agricultural subsidies, could have a significant impact on land use in the region. While removal of agricultural subsidies in Europe may open up markets, only a few countries and possibly a limited number of products may be able to benefit from this.

Two ongoing developments, one external and the other internal, will be of particular concern in the increased integration of the West and Central Asian countries with the rest of the world:

- Successful globalization of emerging economies such as China and India will increase the competition in global markets. The global marketplace embodies increasing competitive pressures, and success in such an environment depends on substantial investments in human capital and the creation of a favourable investment climate.
- The internal pressure comes from demographics. Most West Asian countries have begun a period in which the bulge generation created by the demographic transition is entering the labour force and the imperative is to create jobs. It is almost impossible to imagine the sustained generation of employment opportunities without a successful process of globalization and cross-border economic integration.

Global and regional environmental issues

Another important factor affecting forests and forestry is the growing concern of environmental degradation and the global and regional responses to address the problems. The post-United Nations Conference on Environment and Development (UNCED) period has witnessed a series of international initiatives relating to conservation of biological diversity, control of desertification and mitigation of climate change. Nearly all the countries in West and Central Asia (except Iraq) have ratified the Convention on Biological Diversity (CBD), the United Nations Convention to Combat Desertification (UNCCD), the United Nations Framework Convention on Climate Change (UNFCCC) and the World Heritage Convention. Several countries have also ratified the Kyoto Protocol, the Convention on International Trade in Endangered Species of Wild Fauna and Flora (CITES) and the Ramsar Convention. All these conventions and protocols commit the countries to pursue action in specific areas which directly and indirectly affect the forest sector (see Box 4.13).

BOX 4.13

The Pan-European Biological and Landscape Strategy

The Pan-European Biological and Landscape Strategy was endorsed at the third Ministerial Conference "Environment for Europe" in 1995 with the objective of providing an innovative and proactive approach to stop and reverse the degradation of landscape diversity values in Europe. All the eight countries in the FOWECA study covering Central Asia and the Caucasus are signatories to this strategy. Initiatives under this include support for the preparation of national biodiversity strategies, establishment of a Pan-European Ecological Network, integration of biological and landscape diversity considerations in all sectors, and raising awareness and action to protect threatened species.

Source: EFI, 2005.

Following the ratification of CBD, most countries have prepared National Environmental Action Plans (NEAPs) or National Biodiversity Strategy and Action Plans (NBSAPs). Although priorities may differ between countries, most of these programmes and plans adopt a common framework with considerable emphasis on awareness generation, assessment of the status of biodiversity and efforts to improve institutional capacity. Often these initiatives are based on external financial and technical support and this raises questions about their sustainability, especially in the context of domestic resource constraints.

Approaches to the implementation of UNCCD have been similar to those for CBD. A Strategic Regional Action Plan to combat desertification in West Asia has been developed within the framework of UNCCD. There are also a number of subregional initiatives focused on general cooperation or addressing common problems of concern to more than one country. The Central Asian countries have drawn up a subregional programme on combating desertification (UNCCD, 2003). Two important subregional initiatives in desertification are the Aral Sea Programme and the Caspian Environment Programme, both emphasizing collaborative action to address desertification issues.

Global trends in production of wood and wood products

As globalization intensifies and tariff and non-tariff barriers are reduced drastically, the forestry sector in the region will be influenced by the global trends in production and trade. Competitive advantage rather than natural advantages will become more important. Over the past four decades, global industrial roundwood production has increased by about 60 percent, to the current level of around 1.6 billion m^3 (Whiteman, 2005), although currently it is less than the peak production in the 1990s. In addition, the most important change regards the shift in the regional distribution of production, with a number of countries in the South increasing their production substantially. In recent years, Eastern Europe has become an important supplier of wood and wood products. China has become one of the largest producers and exporters of plywood and furniture. Similarly, the Russian Federation is on the path of recovering from the decline of its forest and forest industry and this could significantly influence global wood supplies and prices.

In view of low productivity, very few of the countries in the West and Central Asia region will have competitive advantage in wood production. With reduced trade barriers, barring a substantial increase in the costs of transportation, wood supply is unlikely to be a major problem. With higher investments in research and development, the cost for producing wood from plantations will decline further. Also improved technologies, including the use of recovered paper, will reduce the raw material input requirements. All these global developments will have an impact on the countries in the region, showing that it may not be cost effective for them to manage forests for meeting the domestic demand of wood and wood products.

Changing geopolitics

As the region holds nearly two-thirds of the proven oil and half of the natural gas reserves, it remains in the centre stage of global geopolitics. The rapidly increasing demand for energy is bound to have enormous influence on the geopolitics in West and Central Asia and, consequently, on the social and economic situation in the countries. Countries that have the necessary internal cohesion and strength (which largely depends on more open and transparent governance and the wider distribution of the benefits of economic growth) could take advantage of the competitive environment, and thus significantly improve their social and economic environment. Although the geopolitical situation is fundamental in understanding the long-term prospects of social and economic development, there is considerable unpredictability.

SUMMARY OF KEY DRIVERS OF CHANGE

Forests and forestry in the West and Central Asia region will be influenced by a number of internal and external factors. Demographic changes, the growth of income and its distribution, and the policy and institutional environment will be the key driving forces. Other aspects, such as environmental changes and the development and adoption of technologies, will also have some impact. Together, these will directly and indirectly influence land use in general, the extent of land under forests and woodlands and the demand for forest products and environmental services. Most economies are likely to witness some diversification, increasing the share of industries and service sectors in GDP while agriculture and related activities decline in importance.

The demand for wood and wood products and environmental services is likely to increase considerably. The construction sector is bound to grow rapidly in many countries, as income from oil and gas are invested to develop infrastructure and to meet the housing needs of a growing adult population. At the same time, there will also be a demand for provision of environmental services, especially recreation. This is particularly in view of the anticipated growth in international tourism, as some of the economies invest in diversifying the economic base.

The internal social, political and institutional environment will to a great extent be influenced by the external global and regional environment. West and Central Asia has been in the centre stage of global geopolitics, primarily because it is the most important source of energy supply to the rest of the world. Competition to access oil and gas supply has been an important determinant of development in the region.

Considering the economic, social, political, institutional and technological differences among countries and the complex interaction of the various driving forces, a wide range of forestry situations can be visualized in the region. While it is difficult to indicate all the possible situations (which should be addressed at a more disaggregated level), some broad trends of the possible paths of development have been identified. Primarily this involves identification of possible scenarios and assessment of their implications on forests and forestry.

M. UEMOTO

Tree root improvement, Kazakstan

5. The future of the forest sector

The previous chapter examined several factors that collectively influence the forest situation in the West and Central Asia region. Considering the many possibilities, the uncertainties characteristic of dealing with long-time horizons and the limitations of data on key determinants of change, it is difficult to envisage all the possible developments. It is possible, however, to point out the broad paths of developments and to identify the general nature of interventions that are required to improve the situation. This chapter focuses on identifying the future direction of changes that arise from the collective impact of various driving forces and what can be done to address the emerging challenges and opportunities.

Traditionally, econometric models are used to forecast future production and consumption, largely relying on a limited number of easily measurable parameters. While this approach is quite important, in societies undergoing fundamental transition a broader approach is warranted. Uncertainties, characteristic of long time horizons, make econometric approaches less reliable. Taking a broader approach is especially useful in situations where the information base is extremely weak, as with the forestry sector.

Therefore, increasingly, long-term outlook studies adopt scenario-planning approaches, combining quantitative and qualitative methods (see Box 5.1). More importantly, scenario approaches encourage stakeholders and society at large to visualize the likely paths of development, and in the process help develop a collective vision of how the future should be and what may be done to improve it. Scenario planning is particularly useful in addressing uncertainties and for analysing the options available in the context of unanticipated developments.

Scenario approaches have been widely used at various levels – addressing issues at the sectoral, local, national, regional and global levels. One of the earliest efforts of scenario planning was used in the oil sector, and assessed the interaction

BOX 5.1

Scenarios – definition

Scenarios are plausible, challenging and relevant stories about how the future might unfold that can be told in both words and numbers. Scenarios are not forecasts, projections or predictions. They are about envisioning future pathways and accounting for critical uncertainties.

Source: Millennium Ecosystem Assessment, 2005.

between prices, demand, investments in finding new reserves, technological developments in exploration and processing, and political changes (see Shell International, 2001, for a more recent analysis). Most recently, the Millennium Ecosystem Assessment used the scenario approach to assess the implications of four alternative paths of development (global orchestration, order from strength, technogarden and adapting mosaic) on key ecosystem parameters, adopting a time frame to 2050. Recently the United Nations Development Programme adopted the scenario approach in the preparation of the Arab Human Development Report (see Box 5.2). The Forestry Outlook Study for Africa (FAO, 2003) and the European Forestry Sector Outlook Study (UNECE/FAO, 2005) used scenario approaches to outline priorities and strategies in the forest sector in their respective regions.

DEFINING FORESTRY SCENARIOS FOR THE WEST AND CENTRAL ASIA REGION

The first step in defining scenarios is identifying the driving forces that will have a critical influence on future developments and how they are likely to evolve over time. Of the two broad groups of factors – internal and external – that were discussed in Chapter 4, the internal factors appear to be more influential in the development of the forest sector. No doubt, the external factors such as competition for securing energy supplies and the attendant developments in geopolitics, global environmental issues and changing patterns of global trade have some bearing on the domestic political and economic situation in the countries and consequently on forests and forestry. Their overall impact,

BOX 5. 2.

Arab human development scenarios

The Arab Human Development Report 2004 identifies three scenarios: maintaining the status quo; the "Izdihar" alternative (the ideal scenario); and the "Half-Way House". According to the authors, maintaining the status quo would lead to intensified conflict, especially destructive upheavals, and if this were to happen the future of human development would be severely undermined. The Izdihar scenario involves a process of peaceful negotiation on the redistribution of power, safeguarding freedom for all, effective political participation, efficient institutions that are transparent and accountable, and an independent judiciary. The third alternative envisages gradual and moderate reforms, which is a pragmatic approach to make the best of regional and international initiatives, giving due consideration to Arab ownership and leadership, adherence to international human rights, inclusion of all societal forces and respect for outcomes freely chosen by the people.

Source: UNDP, 2005a.

however, largely depends on the internal conditions; therefore, for the purpose of this study scenarios will be identified based on the internal factors.

Among the various internal driving forces, some are more predictable than others. For example, because substantial information is available about demographic changes (especially the changes in the total population, rate of urbanization and age structure), predicting future demographic trends is relatively easy. Technological and environmental changes are more uncertain, and they impact society in the long term. Over horizons of 10 to 20 years, it is possible to provide some reasonable indication of the nature of technological and environmental changes and their implications. If major changes occur, the main concern would be to adapt policy and institutions accordingly.

Uncertainties are particularly serious in two areas: economic performance and policy and institutional changes. Changes in these two interlinked areas tend to have far-reaching impacts on the forest sector. Therefore, these two broad groups of drivers are used to define the scenarios to assess the future direction of developments in the forest sector.

Economic performance

Within the West and Central Asia region, there is considerable divergence in the economic situation as well as the dynamics of development. Important components of economic performance include:

- current level of gross domestic product and its growth rate;
- income distribution and extent of poverty;
- external debt, development assistance and foreign direct investment;
- development of internal and external markets and the growth of trade;
- structural shifts in the economies and changes in the relative importance of different sectors;
- technological changes and their influence on production efficiency.

Several countries in the region have relatively high per capita income, income growth exceeds that of the population, economies are diversified and efforts are under way to reduce disparities in income. However, some countries are at the other end of the scale, and income distribution remains highly skewed even in countries that have relatively high per capita income. The dependence on income from the oil sector makes a number of countries highly vulnerable to changes in fossil fuel prices. However a number of countries are striving to diversify their economies through investing in agriculture, industries and the services sector, including tourism.

Regional economic cooperation is expected to have a significant impact on a number of economies in the region. Cyprus became a member of the European Union in 2004, and negotiations for Turkey's accession were launched in October 2005, although uncertainties remain. Membership in the European Union will have significant impacts, especially the access to European Union markets, increased flow of investments, labour mobility, access to technologies, and above all European Union support for a number of activities. Membership

also implies adherence to common policies, strategies and rules and regulations. There are also a number of other regional economic cooperation agreements with differing potentials, and the benefits from these agreements will largely depend on the overall economic and institutional strengths of the regional grouping.

While the overall situation in each country tends to be very specific with varying levels of economic performance, for the purpose of analysis the following economic scenarios have been identified:

- Countries such as Cyprus, the Islamic Republic of Iran, Kazakhstan and Turkey are making substantial progress in developing stable, diversified economies and thus they will be able to take advantage of emerging opportunities and challenges. Many have also implemented wider policy reforms that help to reduce inequality and poverty.
- A number of countries (for example, Kuwait, Oman, Saudi Arabia and Turkmenistan) are highly dependent on the oil and natural gas sector for their economic growth, although diversification efforts are under way for many of them. Although the world is still a long time away from reducing its dependence on oil, these economies are vulnerable to changes in global energy markets. Dominance of one sector has to some extent undermined the viability of some of the traditional sectors, which are sometimes largely dependent on a high level of subsidies. Unbalanced development has also brought about inequitable distribution of income, mostly due to policy and institutional limitations.
- The third cluster includes those countries facing serious economic difficulties, characterized by low incomes and poor growth rates. Many of them, for example Afghanistan and Yemen, have very limited natural resources. Human capital remains poorly developed owing to low investments in education and health care. The high level of poverty makes domestic resource mobilization extremely difficult, and increases dependence on external support. Unless some unanticipated developments take place – discovery of a large oil or natural gas reserve, for example – low income and poverty are likely to persist.

Instability arising from conflicts is a major factor that affects the economic performance of a number of countries in the region. While the fossil fuel resources are a major driver of economic growth, conflicts stemming from competition to control these resources undermine social and economic development. Conflicts arising from ethnic differences and competition over other natural resources, especially water, have also led to considerable instability in the region.

Policy and institutional environment

The policy and institutional environment is another critical dimension that will influence future forestry scenarios. Even how the future economic situation unfolds will be largely determined by the institutional environment. Some key components of the policy and institutional dimension include:

- nature of government (how government is formed and changed) and government policies;
- governance and transparency;
- ability/competence of government institutions;
- development of private sector and civil society organizations;
- state of community organizations;
- development of market institutions;
- relationship between different institutions and their ability to resolve conflicts.

The policy and institutional situation in the countries differ considerably. In a number of countries, governments are formed through democratic processes, while in others people's participation in governments remains limited. However, the situation is changing and, slowly, elected representatives are having a say in the local administrations of a number of countries. Recently, women have been granted voting rights in some of the countries and this is seen as a step forward to larger changes. In many Central Asian and Caucasus countries, governments still function largely under the pre-independence framework, although popular uprisings have triggered some changes.

The policy and institutional scenario in the region for the next two decades will be extremely varied. While some countries have effectively established democratic institutions, others are still far from accomplishing such a transition.

Public sector. The public sector remains the most dominant institution in all aspects of economic life in most countries. However, public sector effectiveness varies significantly:

- In some countries, the public sector controls the key sectors and often prevents the development of alternative institutional arrangements. This occurs primarily when authoritarian governments are in power. In this case, almost all other institutions become highly dependent on government agencies and somewhat prevents them from providing alternative views on, or approaches to, addressing developmental issues.
- There are situations where *de jure* power is vested with public sector institutions, but in view of the limited human, financial and organizational resources they are often unable to carry out their functions. Such situations have often led to the emergence of informal institutional arrangements.
- A more appropriate development would be where the public sector plays a facilitating role, laying down the policy and legal framework and ensuring a level playing field to enable other actors – private sector, civil society organizations, community groups – to perform effectively.

Private sector. As with the public sector, the development of the private sector could also take different paths. There are instances where the private sector has a very limited role, particularly when all key economic activities are under government control. It is also easy to imagine, however, a situation where the

private sector dominates all spheres of economic activity without the proper mechanisms in place to regulate their functioning, especially to ensure that market mechanisms contribute to accomplishing broader social objectives. Privatization has been a thrust area of economic policy reforms in some countries, especially those that had been under centralized planning. However, the lack of transparency in the privatization process has led to powerful vested interests appropriating public assets.

Civil society organizations. The development of civil society organizations also faces similar problems. For the most part, civil society organizations are not well developed or almost non-existent in many countries of the region. The organizations that do exist are often highly dependent on governments or international organizations for funding. Their responsibilities involve such tasks as environmental education or creation of public awareness, always with the support of the government and other organizations. While civil society organizations have the potential to provide an alternative perception of social and economic development, their ability to do so is constrained in many countries.

Community organizations. There could be situations where traditional institutional arrangements – community groups, tribal protectorates, committees of village elders, shuras – play important political, social and economic functions at the local level. Mostly these situations arise when governments and private-sector institutions are less developed and ineffective. As other formal institutional arrangements emerge and local economies become increasingly integrated into national and global economies, traditional institutions become weaker and often fade into irrelevance. However, they do remain important under certain situations.

A desirable situation. An ideal situation would be where a mix of institutions play different but complementary roles. Largely this depends on the overall political and social environment. In more open democratic societies, the private sector and community organizations play an important role in various economic and social spheres. In general, economic activities are typically in the realm of the private sector, while the public sector provides the necessary policy and legal frameworks. NGOs are particularly active in the social and environmental spheres, ensuring that these aspects are not sidelined by the government and the private sector. They also play an important role in improving efficiency and transparency in the functioning of private and government institutions.

The policy and institutional scenario in the West and Central Asia region will, therefore, be extremely varied in the next two decades. Some countries will experience a more balanced development with a mix of well-developed and efficient institutions while others may be far away from that goal. In a few countries, the public sector will remain the most important institutional entity, even though it may not be able to function efficiently. Traditional community-

level organizations, though declining, may still remain important in local resource management, especially when formal institutional mechanisms are ineffective. It is also important to understand the potential for conflicts between different institutional arrangements, especially between tribal community arrangements and the more centralized government institutions.

The internal institutional environment, to some extent, will also be influenced by the values, objectives and strategies of external agencies, including international organizations operating in the countries. The extent of this influence largely depends on the overall internal economic and institutional environment. Strong national institutions will be in a better position to channel external assistance effectively. In the absence of effective internal institutional arrangements, external support could be dominated by donor agenda and priorities, with all their attendant problems.

ECONOMIC AND INSTITUTIONAL SCENARIOS

A number of possible scenarios have been developed to show the current and anticipated changes in the economic situation and the probable direction of institutional development. They are presented in Table 5.1, and then examined more closely with regard to their influence on forests and forestry.

Balanced development

The "balanced development" scenario is largely an outcome of a combination of effective pluralistic institutions and favourable economic conditions (see Box 5.3). Countries are implementing various measures to develop highly diversified economies in order to reduce their vulnerability to other factors. Economic reforms that promote savings and investments and that bring rapid growth are in place. The benefits from such growth reach all levels, helping to significantly reduce poverty. Policies and programmes specifically aimed to bridge the rural-urban divide and rich-poor gap are extremely effective. Realizing that globalization is rapidly altering competitiveness, countries are investing in education at all levels to improve human capital and are positioning themselves to take advantage of emerging opportunities and facing the challenges. Research and development efforts also receive substantial support, enabling countries to develop and adopt appropriate technologies.

Stable and rapid economic growth under the "balanced development" scenario is largely based on the existence of a highly pluralistic institutional environment.

TABLE 5.1.
Economic and institutional scenarios in the region

Scenario	Economic situation	Institutional development
Balanced development	Sustained, stable and equitable growth	Well-developed institutional framework
Unbalanced development	Rapid growth, but inequitable and not diversified	Inadequately developed institutions
Struggling to achieve development	Low income and low growth rates	Limited institutional capacity

BOX 5.3
Key characteristics of the "balanced development" scenario

- rapid growth of the economy and improvement in the distribution of income, resulting in dramatically reduced poverty
- high level of investments in human and physical capital, increasing the competitiveness of the countries
- diversification of the economies with increased efforts to develop the industrial and services sectors, helping to reduce the direct and indirect pressure on land and other natural resources
- a highly pluralistic institutional environment
- active civil society organizations with the necessary ability to take up issues of public concern
- effective public and private institutions that function impartially and transparently, ensuring a level playing field
- ability to adapt and to influence the globalization process

Political and institutional systems are democratic and ensure equity and justice. Transparent and just rules and regulations implemented effectively provide a favourable environment for rapid economic growth. High investment in education and health care improves the quality of human resources. Poverty declines rapidly and, to that extent, the dependence on unsustainable natural resource uses diminishes dramatically. Willingness of the society to meet the costs of maintaining environmental quality is high.

Countries under the "balanced development" scenario are able to build effective bridges across national borders. Many of them actively participate in the global and regional economic cooperation agreements and are better able to address external shocks. Regional cooperation agreements and the institutions supporting them are effective and are able to boost cooperation, minimizing conflicts. Trade is liberalized, but there are adequate international and national arrangements to ensure a win-win situation.

Forests and forestry under "balanced development" scenario. Evidently the "balanced development" scenario is highly favourable for the development of the forestry sector, though it may remain a minor sector in the economy. Some of the key features of forests and forestry under this scenario are:

- wider recognition of the multiple value of forests resulting in a balanced emphasis on their production, protection, and social and cultural benefits;
- substantial emphasis on the environmental value of forests, with particular attention on amenity and recreational uses;
- wider application of integrated management of natural resources helping to minimize resource-use conflicts;

- as a broad-based economy emerges and agriculture production is intensified, the pressure on forests declines substantially, stabilizing and improving the forest situation;
- improved efficiency in the production and processing of wood and other forest products (especially through the application of productivity enhancing and resource-saving technologies);
- public forestry institutions are able to play an effective facilitating role, supporting other actors, especially the private sector, community groups and civil society organizations;
- well-developed private sector that operates according to broader policies and legislation;
- civil society organizations play a lead role in mobilizing support for rational and sustainable use of resources ensuring efficiency and equity;
- all these together improve the forestry situation significantly, enhancing the flow of goods and services.

Unbalanced development

The "unbalanced development" scenario is characterized by rapid but unbalanced economic growth and, more importantly, persistent weaknesses in the institutional framework. Important features of this scenario are:

- Overall economic performance is highly dependent on the growth of one or a few sectors, which directly and indirectly accounts for a major share of the national income. For example, in the West and Central Asia region extraction of oil and natural gas remains the main engine of economic growth.
- As substantial surpluses are generated from the export of oil and natural gas, the development of other sectors are neglected. Viability of traditional sectors such as agriculture and animal husbandry are undermined because of cheaper imports.
- High dependence on natural capital disregards the development of human capital. In general, there is a tendency to neglect investments in education and building up appropriate skills. As a consequence, there is high dependency on imported labour (skilled and unskilled), with high levels of local-level unemployment.
- Very few countries in the "unbalanced development" are investing in research and development and enhancing domestic innovation. There is a high level of dependency with imported technologies (as this is easier in the short term) and this in a way undermines development of indigenous science and technology capabilities, which is critical for long-term economic progress.
- Many countries are striving to diversify the economic base through subsidizing the development of other sectors. But such subsidies promote inefficiencies and will be unsustainable in the long term.
- High surpluses generated by the dominant sectors also results in high-income disparities. Those who control or have access to resources receive most of the income, while those dependent on traditional low-income sectors tend to remain poor.

Many of the problems under the "unbalanced development" scenario come from serious institutional weaknesses. While economic growth has been rapid, policy and institutional development has lagged behind, and frequently the dominance of one sector and the institutions associated with it undermines broader institutional evolution.

Forestry situation under the "unbalanced development" scenario. The key characteristics of the forestry sector under this scenario are:

- Forests and forestry are not seen as an important sector deserving attention, generally because policy-makers and planners are more focused on the other high income-generating sectors. Even when there is emphasis on enhancing self-reliance, attention is focused on agriculture and animal husbandry rather than forests and forestry.
- High income enables countries to import most wood and wood products. The long-term nature of forestry investments make domestic wood production less attractive compared with alternatives that have short pay-back periods.
- Some segments of society, especially in rural areas, are excluded from benefiting from the rapid growth of the economy and continue to depend on forests for wood and other forest products. Their ability to invest in improved management is limited, resulting in resource degradation. Formal institutions also remain weak and are unable to adopt sustainable management practices.
- Rapid development of infrastructure (especially roads) and urban expansion often adversely affects forests, including through outright clearance or degradation. In addition, insufficient attention is given to assess the environmental impacts of large-scale investments and to adopt preventive or mitigation measures.
- A similar situation often develops in the context of large-scale agricultural and related infrastructure development, which results in desertification, soil erosion and deposition of toxic salts. Preventive and mitigation measures receive inadequate attention.
- As income increases, there is increased pressure for recreational use of forests and woodlands; however, in the absence of significant improvements in management, intensive use could result in site degradation and consequent decline in recreational benefits.
- In view of the importance of enhancing the amenity value of urban areas (especially since a significant share of economic activity is concentrated in urban areas), urban and peri-urban forestry are receiving some attention.
- Formal forestry institutions – forestry agencies, education, training and research institutions – are not well developed. Because forestry is not a core sector, it seldom attracts the required human and financial resources.

Struggling to achieve development

This scenario represents a highly unfavourable economic and institutional situation. Several countries in the West and Central Asia region are making efforts

to tackle slow development. Political upheavals of the past have led to precipitous economic decline and collapse of institutions. Some of the Central Asian and Caucasus countries have been more successful in rebuilding their economies, but some others have economies that are yet to grow out of the post-Soviet period decline.

Poorly developed human and natural resources are the fundamental reason for persistent lags in development. Unfavourable climatic conditions limit the development of agriculture or animal husbandry. Low income has also undermined the development of human skills and technological improvements. Resource constraints are becoming critical, especially in the context of high population growth rates. Remittance from employment in other countries has become an important source of income for some of the countries and this has led to substantial migration.

As with the economic situation, policy and institutional development also remains stagnant. Many countries under this scenario have vestiges of old organizations, but with substantially reduced ability to discharge their responsibilities. The overall economic decline has reduced the human and financial resources available to them. In many cases, there is frequent organizational reshuffling without any adequate efforts to understand the more fundamental problems. Public-sector organizations dominate, and often an alternative system that would be able to deliver public services efficiently is not in place. Market-based institutions are poorly developed and often economic liberalization in the absence of adequate public oversight and transparency have led to the emergence of powerful vested interests which have been able to appropriate public resources, taking advantage of the reform processes.

The unfavourable economic situation undermines the development of viable formal institutions. In the meantime, some traditional institutions will continue to exert their authority, although often with limited impact. At the local level, traditional community-based organizations (e.g. tribal committees, shuras) remain more important. They are often in a better position to provide the services required by the public, and more importantly some social stability. While these traditional organizations play a vital role in resource management, in certain situations they face a number of constraints when dealing with larger issues, especially in the context of increased interaction with the outside world.

Forests and forestry under the "struggling to achieve development" scenario. Obviously, this represents the worst-case scenario for forests and forestry, resulting in the following situation.

- In view of the weak economic situation and high population pressure, forests are subjected to intense pressures, such as the conversion of forests to agriculture, intense grazing and the widespread collection of timber, woodfuel and non-wood forest products.
- In regions where valuable forests exist, unsustainable logging takes place, although forests in this regard could often be an important source of income

to the government. Institutional weaknesses results in illegal logging and the consequent loss of potential income.
- Degradation and desertification of land continues to be a serious problem.
- Loss of biodiversity persists.
- Forestry agencies are poorly developed and have very limited capacity in terms of human and financial resources. Often formal institutions built on the basis of external support remain unsustainable.
- The ability of governments to mobilize resources (through taxes and other means) remains constrained and consequently they are unable to allocate resources to forestry because of other priorities such as agriculture, education, health care and infrastructure.
- Forestry development is often largely dependent on external support, but even well-intentioned interventions are often unsustainable, especially in the context of limited national capacity.
- Vestiges of local community organizations exist, and in some cases they are in a better position to exercise control over local resource management.

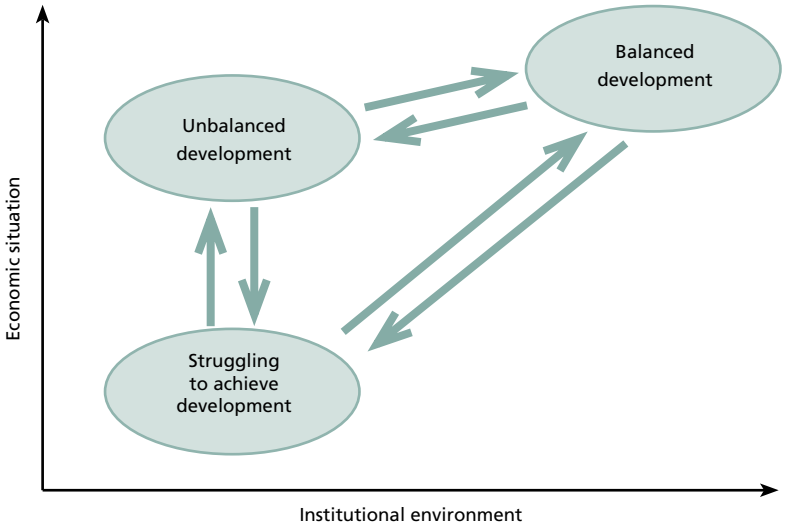
EVOLUTION OF SCENARIOS

The three scenarios represent a broad range of possibilities within the economic and institutional dimensions. A country's position among the many possible situations depends on the state of development of its economy and institutions (Figure 5.1). Depending on the economic and institutional changes a country may move in any direction.

As illustrated in the diagram, the "balanced development" scenario represents an idealistic vision under which economic and institutional development are balanced, offering substantial stability and capacity to address unanticipated changes. The vibrancy of institutions helps countries to overcome internal and external problems. Economic stability is ensured through balanced development of all key sectors. However, it is important to note that sustaining this scenario requires persistent efforts by all stakeholders. Especially in a highly globalized environment, competitive advantages may change rapidly and the system has to anticipate and respond to such changes; otherwise, there is a danger that it could decline to "unbalanced development" or even sharply revert to "struggling to achieve development", as the diagram shows.

The "unbalanced development" scenario could in the long term move towards the scenario "balanced development" provided substantial efforts are made to improve the institutional environment. Creating an enabling environment to encourage the full involvement of all actors is crucial. On the economic front, the emphasis should be on diversifying the economy, improving the distribution of income and enhancing long-term stability. Failures in achieving these objectives could have consequences in the economic situation, pushing the countries towards the "struggling to achieve development" scenario. Such a decline could also result from external factors, such as external interventions or the rapid

FIGURE 5.1
Possible scenarios



reduction in the price of commodities and products that are critical to economic growth.

"Struggling to achieve development" is probably the most difficult scenario to address, especially in view of the mutually reinforcing weaknesses in the economic and institutional fronts. In many cases, the situation could remain unchanged for a long period of time, especially when broad-based long-term external support is lacking. Emphasis needs to be given to address poverty and deprivation through appropriate resource management practices and giving due attention to distributing the benefits in an equitable manner. Building up human capital and nurturing institutions that can be sustained by the economy are two other important measures that would improve the situation. Systematic efforts could help to build up the economy and institutions in a balanced way, enabling a gradual move towards the "balanced development" scenario, although this development could take years.

IMPLICATIONS OF THE SCENARIOS ON FORESTRY IN 2020

The overall forestry situation in West and Central Asia in 2020 will largely depend on the proportion of countries in the different scenarios; therefore, it is extremely difficult to provide a clear indication of what may happen in the region as a whole. The situation that could emerge in the next 15 years will be as diverse

as it is today, although the outcome will depend on overall efforts to bring about economic and institutional changes. The ideal situation would have the most countries in the "balanced development" scenario, fewer "struggling to achieve development", and significant institutional improvements to move countries out of the "unbalanced development" scenario. Some broad patterns of change can be visualized with respect to key parameters, especially with regard to the state of forests (especially their condition) and the demand for wood and wood products, but also for the various environmental services.

Forest cover, afforestation and sustainable management

On the whole, the region's forest cover is expected to increase in most countries because the importance of agriculture (including animal husbandry) as the main source of income and employment is declining. Increasing urbanization and the development of the manufacturing and services sectors could see a reversal of agriculture expansion. There will also be some increase in afforestation and reforestation that will help to compensate for the loss of forests, although not for the loss of biodiversity. The likely exceptions would be countries such as Afghanistan, Kyrgyzstan, Tajikistan and Yemen, where a sizeable population will still be rural and dependent on agriculture and animal husbandry. The problem will remain very serious in countries with high population growth rates, particularly Afghanistan and Yemen. The continuing political instability in some of the countries is likely to worsen the situation.

Degradation will be a major problem that several countries – including but not limited to those with low forest cover – have to confront. Countries with substantial forest cover (Georgia, for example) might see increases in timber exploitation – both legal and illegal. Poorly developed institutional capacity will remain an important constraint in the improvement of forest management for most countries (see Box 5.4). In several low forest cover countries some improvement in forest cover could be expected, especially in the context of increased urbanization and reduction in the dependence on land.

BOX 5.4

Saudi Arabia: declining state of forests

Poor institutional structure and lack of professional foresters are among the main reasons for deterioration of some of the forest regions… If the current forest status persists, many of the South Western regions of the Kingdom will particularly witness serious environmental problems due to loss in green cover which leads to lasting environmental, social and economic problems in the region.

Source: FOWECA country outlook paper, Saudi Arabia.

In most countries, the extent of natural forests is likely to remain stable and there will be some increase owing to continued reforestation and afforestation efforts. Most of the afforestation efforts will be focused on environmental improvement, especially with establishing shelterbelts and windbreaks and creating urban green spaces. Economically better-off countries, especially those seeking to diversify their economic base, are expected to pay greater attention to improving the urban environment. There could be some situations where agriculture is abandoned because of declining interest, especially as opportunities in other sectors increase.

Several countries are implementing afforestation and reforestation programmes to address specific environmental problems; one such programme has been implemented in the Aral Sea area. The future of such initiatives will to some extent depend on regional and subregional cooperation and, more importantly, to the availability of financial and technical resources. Currently, some of the region's major afforestation programmes – the Aral Sea Programme for instance – are dependent on external support. Sustaining this in the long term depends on internal resource mobilization; however, only a few countries (e.g. Kazakhstan) have the potential for raising resources domestically.

Although there may be some increase in forest cover, the ability of the countries to implement sustainable forest management will remain limited. This would require significant investments, especially to improve policy and institutional arrangements, including technical capacities. Without these investments, the area of forests and woodlands covered by sustainable management is likely to remain negligible, and problems such as forest fires are expected to worsen.

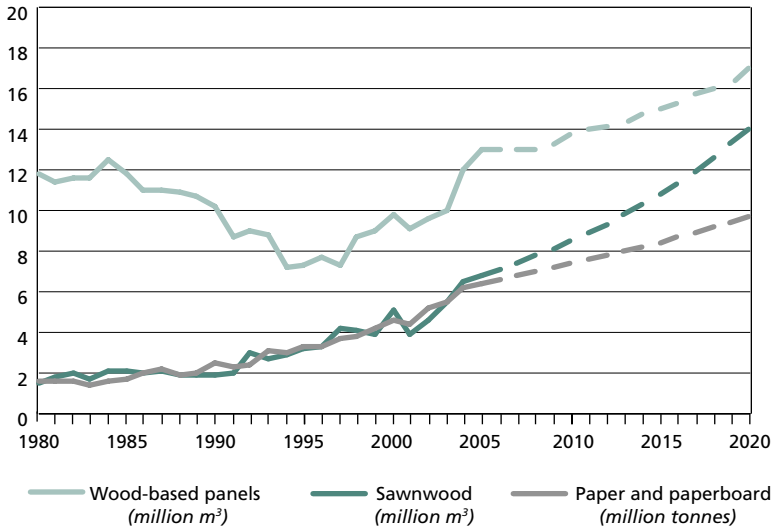
Wood and wood products consumption and supply

The consumption of wood and wood products is likely to increase in the entire region as lifestyles change and population, incomes and urbanization increase. Figure 5.2 illustrates the projected consumption of sawnwood, wood-based panels, and paper and paper products to the year 2020.

During the next 15 years, consumption is expected to grow at an average annual rate of 3 to 4 percent for sawnwood and 4 to 5 percent for wood-based panels and paper and paperboard. Faster growth (in relative terms) is expected in Central Asia, whose economies have recovered in recent years. Currently, the region is a net importer of forest products, exceeding about US$12 billion in 2004, and this is likely to double in real terms over the next 15 years. West and Central Asia will remain one of the most important net global forest products importing region, mostly because of its extremely poor resource base.

The scope for enhancing raw material supply from within the region is extremely limited and most of the demand will be met by increased imports from outside the region (mainly Europe, including the Russian Federation, followed by Southeast Asia). In view of the low productivity, wood production will not be competitive in most countries (see Boxes 5.5 and 5.6). Some strategically located countries that have a large domestic market (Iran and Turkey, for example) will

FIGURE 5.2
Trends in consumption of key forest products in West and Central Asia



BOX 5.5
Economic viability of wood production, Lebanon

Like all Mediterranean countries, the wood produced in Lebanon is generally of low quality. It is therefore unlikely to see investments in the field of wood production, unless intensive forest plantations are developed. Even in the case of intensive forest plantations, the wood production in Lebanon will not be able to compete with other wood sources.

Source: FOWECA country outlook paper, Lebanon.

BOX 5.6
Economic viability of wood production, Syrian Arab Republic

The natural forests in Syria have no appreciable economic importance in respect of timber production. Most of the wood production is consumed in the form of firewood or utilized in the production of charcoal.

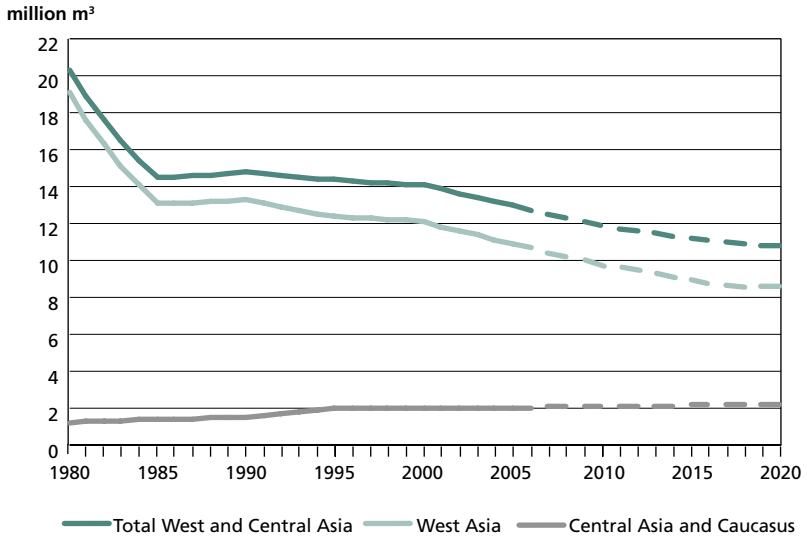
Source: FOWECA country outlook paper, Syrian Arab Republic.

be in a better position to develop forest industries based on imported industrial roundwood. A rapidly growing paper industry (mainly tissue paper and corrugated case material) has also arisen in the Gulf Cooperation Council (GCC) countries, largely based on imported wastepaper (Mubin, 2004). Iran and Turkey have also experienced a rapid growth in the panel and pulp and paper production sectors. The declining profitability of the wood industry in Europe could further speed up the relocation of industries, to the advantage of some of the countries in the West and Central Asia region – those of course that have low labour costs, a stable investment climate and access to wood supplies. Although most countries may not have any natural advantage in producing wood, they may still be in a position to develop wood industries through their competitive advantage.

Woodfuel consumption

Woodfuel consumption is expected to decline over the next 15 years, especially in view of the improved access to commercial fuels (from higher incomes and increases in the urban population). For the region as a whole, woodfuel consumption declined from about 17.4 million m^3 in 1980 to about 13.1 million m^3 in 2000 and is expected to keep declining, as shown in Figure 5.3 (Broadhead, Bahdon and Whiteman, 2001). There will of course be substantial intercountry variation because of the differences in the driving forces. For example, woodfuel consumption is expected to increase in Afghanistan and Yemen in West Asia, and Uzbekistan and Tajikistan in Central Asia. Considering the weaknesses in consumption data, these need to be treated as indicative.

FIGURE 5.3
Trends in woodfuel consumption, 1980–2020



Provision of environmental services

Considering the general upward trend in income in most countries, an increase in the demand for environmental services is inevitable. Development of urban green spaces and recreational facilities will receive considerable attention. Ecotourism, in which forests and woodlands form an important component, is also expected to grow rapidly but this, however, depends on the improvements made in the transport and communications sectors, political stability and improved security. Forests and woodlands close to urban areas will be subjected to intense recreational pressure. Unless concerted efforts are made to manage forest recreation, there will be a substantial decline in the resource base and a deterioration of recreational value. Especially in many of the West Asian countries, demand will increase to such an extent as to cause severe degradation if adequate efforts are not made to regulate recreational use.

The demand for protection of agricultural land and habitations from desertification and land degradation will also increase, resulting in higher investments in the establishment of shelterbelts and windbreaks. Much of this will, however, depend on the ability of the key players, namely governments and farmers, to make such investments. The prospects of an increase in the efforts would therefore vary between countries. In many low-income countries, expanding programmes to arrest desertification would be rather very slow and will depend very much on external funding. There will, however, be other countries that are economically well-off and hence will be able to meet the growing demand for environmental protection.

SUMMARY: OUTLOOK FOR THE FUTURE

Considering the current low forest cover situation and the ongoing afforestation and reforestation efforts, forest cover in the West and Central Asia region is likely to increase. The net increase in forest cover is largely due to increased investments in afforestation. However, degradation, together with the loss of biodiversity and desertification, is likely to persist in many countries. Urban forestry is expected to receive more attention, especially in the more economically better-off countries. Most of the demand for wood and wood products will be met through imports, which is expected to increase in response to the growth of population, higher incomes and urbanization. In view of the high proportion of population in the younger age group, housing needs will surge in the coming years resulting in continued growth of demand for construction material, furniture, etc. These will be met almost entirely through increased imports and will not have any backward linkages resulting in increased domestic wood production.

Provision of environmental services will however remain the most important functions of forests and woodlands. In addition to the demand for urban green spaces, the demand for recreation will increase substantially, especially as a result of the increase in tourism. Other environmental service that requires particular attention is the protection of agriculture and habitations from desertification and sand encroachment.

Priorities and strategies for the forestry sector will have to be carefully crafted taking into account the overall social and economic scenario. In the short term, given the economic and institutional constraints, the options available to a number of countries may be rather limited. Nevertheless, it is still possible to identify measures to improve the situation, accepting the current level of constraints; these are discussed in the next chapter.

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Conifers planted to rehabilitate an asbestos mining area, Troodos State Forest, Cyprus

6. Priorities and strategies

As discussed in the previous chapter, the overall economic and institutional environment in the West and Central Asia region varies across countries. The changes in the economic and institutional conditions would alter the demand for forest products and services (and the ability of society to fulfil the needs). Thus, while it is important to address current concerns, it is equally important to understand the probable future changes and prepare forestry to adapt to such changes. The options available to policy-makers and planners under different scenarios need to be clearly identified to take full advantage of a given situation.

COMMON OBJECTIVES AND APPROACHES

While the existing scenarios may be different, there are considerable similarities in the broad objectives. Accomplishing sustainable forest management will be a common long-term goal for all the countries. Within this broad objective, what has to be actually accomplished (for example, the mix of goods and services) and how (the nature of interventions, the kind of institutions required and the technologies to be adopted) will differ depending on the specific circumstances. Even when the mix of goods and services differ there may be some identity among the countries, while the differences become more pronounced in details as the nature of products and services are defined more precisely at successive levels. The common issues confronting most of the countries in the region are:

- very low forest cover and extremely low productivity because of adverse climate and soil conditions;
- severe environmental degradation, especially desertification and severe water stress;
- boundaries of forests, wooded land, rangeland and agriculture are not well defined;
- increasing demand for recreational and amenity values, especially in the context of the increasing pace of urbanization;
- overall weaknesses in the policy, legal and institutional framework.

While there may be some variation in the priorities and strategies, the broad similarities of the problems suggest the following priorities:

- give emphasis to the provision of environmental services;
- adopt an integrated approach to land management;
- improve the policy and institutional environment;
- enhance subregional, regional and international collaboration.

Provision of environmental services to remain the key objective

Considering the current environmental situation in the region – the arid and semi-arid conditions, the high level of desertification, declining agricultural

and rangeland productivity because of land degradation, loss of biodiversity, increasing water stress – the provision of environmental services will remain the most important concern for almost all countries. Continued urbanization will require increased investment in urban forestry. Use of forests and woodlands for recreational purposes – for example ecotourism – is another priority owing to the rapid growth of tourism.

What precisely should be given importance largely depends on the specific ecological conditions and the economic situation. For example, for the countries of the Arabian Peninsula, Afghanistan, Armenia, parts of Iran and Turkmenistan, controlling desertification, including sand-dune stabilization, will be an important priority, whereas in countries with mountainous topography, conservation of watershed values will be the most important objective. Both in West and Central Asia, there are several countries where water is harnessed for irrigation and electricity generation (Iran, Kyrgyzstan, Tajikistan and Turkey) and, therefore, stabilizing water flow is critical.

For the most part, the productive functions of forests are declining and the trend is likely to persist. Industrial roundwood production seems to be the least priority for the region, not for lack of demand but because these countries cannot produce it economically. Even in those countries where industrial wood production had at one time been significant, both the ability to substitute local production with imports and the shift in management objectives towards providing environmental services have led industrial wood production to decline.

Although the long-term demand for woodfuel is declining, it will still remain an important use of forests and woodlands in a number of countries, especially for those people whose access to alternative commercial fuels is limited. Charcoal consumption is registering an increase in a number of countries, as higher incomes have led to its greater use as a socially preferred fuel, especially in traditional cooking. Imports have, therefore, increased and the trend is likely to persist. Increasing demand has also led to increased domestic production, most of which is done illegally.

The production of non-wood forest products, including medicinal plants and their processing, will continue to be important for a number of countries; however, a significant share of production is expected to come from organized cultivation. Increasing emphasis on quality control and a stable supply would necessitate the domestication of most commercially important non-wood forest products. Collecting products from the wild is also expected to decline in the context of urbanization, reduced availability of rural workers and the consequent increase in wages.

Integrated approach to resource management

Considering the overall state of forest and tree resources in the region and the continuum of different land uses, accomplishing the objectives of management – whether for the provision of environmental services or for the production of wood

and other products – warrants an integrated approach to resource management. The need for an integrated approach stems from the following factors.

- The extent of area designated as forests is rather limited in most countries. Most countries in the region have low forest cover, less than 10 percent of the geographical area.
- A significant share of woodfuel, fodder, wood and non-wood forest products and services is obtained from non-forest lands, including agricultural land. In addition, in almost all countries in the region, problems like watershed degradation, loss of biodiversity and desertification arise from poor management of agriculture and rangelands, and isolated efforts to arrest these within forests may have little overall impact.

Addressing the problems of the provision of environmental services and the production of wood and other products requires policies and strategies that cut across the different land uses and sectors and that adopt a landscape approach. This suggests that forestry will not be able to exist as a distinct sector, but that forestry concerns become well-integrated with other land uses.

Policy and institutional adaptations

The focus on the provision of environmental services and the need to adopt an integrated approach to resource management would necessarily imply substantial improvements in the policy framework and institutional arrangements relating to land use in the region. Traditionally, forest policies have largely focused on areas that are controlled by public-sector forestry agencies (State Forest Funds as in the case of many former Soviet Republics). An increase or decrease of forest goods (wood and non-wood products and environmental services) is not entirely dependent on lands that are designated as forests, and most often a significant share comes from other lands. Many environmental problems such as loss of biodiversity, desertification, soil erosion and watershed degradation stem from inappropriate use of agriculture and pasturelands. The prevention and mitigation of these problems requires more broad-based policies than are conventionally formulated.

Formulation and implementation of policies for integrated land-use management also requires more broad-based institutions than what most countries currently have. Revamping public-sector forestry agencies, which currently play a dominant role, will require re-examining the core values, functions and structures and making appropriate changes. Public-sector forestry agencies will have to work very closely with other sectors, especially the agriculture, animal husbandry, urban development and tourism sectors. The increasing role of the private sector, community groups and civil society organizations provides new opportunities for the production of forest products and environmental services. Collective action with other governmental and non-governmental agencies will require redefining the roles and responsibilities of each and developing appropriate policy and institutional frameworks. In some cases, this will require reinventing existing institutions.

Subregional, regional and international collaboration

A common history, economic interdependence and ecological contiguity of countries in the region underscore the importance of intercountry collaboration at different levels. Sharing of information and technology and undertaking joint initiatives are particularly important to reduce costs and to especially enhance the effectiveness of resource management initiatives. Subregional and regional collaboration is particularly effective for addressing problems such as forest fires and pest and disease incidence. Another important area where intercountry collaboration is particularly essential, or even a necessity, is in the management of transboundary protected areas. Resource assessment, education, research and training are other areas that could significantly benefit (as they can reduce costs) from subregional and regional collaboration.

SCENARIO-SPECIFIC STRATEGIES

The broad priorities and strategies proposed for the region as a whole need to be refined taking into account the specific national and local conditions. While it is difficult to elaborate them, some broad indications of the nature of interventions appropriate to different scenarios are given below.

Struggling to achieve development

As pointed out in the previous chapter, countries under the "struggling to achieve development" scenario face substantial economic and institutional problems and, therefore, the priorities and strategies in the forestry sector will have to acknowledge them. Financial and human resource constraints will be of particular concern. Forestry is unlikely to be a high-priority sector. The overall approach under this scenario can be summarized as "build up from the base", and focuses on the following:

- meeting people's basic needs sustainably;
- building up local institutional capacity;
- improving/adapting local-level technologies and upgrading skills;
- focusing on options that are less demanding in terms of financial resources.

Meeting people's basic needs sustainably. A number of countries in the region (Afghanistan, Tajikistan and Yemen) will continue to have a high proportion of the rural population dependent on low productivity agriculture and animal husbandry, which implies high levels of poverty. Even in countries that are largely urbanized there will be a sizeable rural population with limited access to markets and meeting the local consumption needs will be an important objective in resource management. Still even if markets did exist (currently, there is a limited number of specialty products, including medicinal plants and certain non-wood forest products), local communities may not be able to produce products competitively. Meeting basic needs with minimal investments of human and financial resources will hence be the priority for the management of land and other natural resources. Conservation of soil and water in support of sustainable agriculture will be the other thrust area of land management, including forestry.

Opportunities for the production of industrial roundwood will be rather limited as long as this scenario persists. Because both the institutional and economic environments remain unfavourable, they may not be able to make industrial roundwood production sustainable. One of the major problems that many countries will need to address is the illegal removal of wood (particularly in Afghanistan, Azerbaijan and Georgia). A costly law enforcement system, especially through centralized bureaucracies, is unlikely to be viable in such situations and it may be necessary to explore low-cost institutional options.

Building up local institutional capacity. While institutional reinvention will be important under all scenarios, the scenario of "struggling to achieve development" will require specific attention, especially because of the poorly developed formal forestry institutions. The economic situation in most countries under this scenario excludes developing institutional arrangements that have high transaction costs. While external support comes in handy to build up institutions – forestry departments, research and education institutions, community resource management agencies – countries often find it difficult to sustain them once donor support ceases. The financial resources that will be available will often just be adequate to pay salaries, and the state forestry agencies will be unable to undertake even routine forest management responsibilities.

Much of the actual resource management will have to be implemented by local community groups and organizations, especially the committee of tribal elders, shuras, tribal protectorates, etc. As such, in many situations these are the only effective institutional arrangements at the local level. Supporting these groups so that they can conserve and manage forest resources remains the most cost-effective option. Governments' efforts should be primarily to function in a facilitator role in order to strengthen the technical and managerial competence of local-level organizations.

Improving and adapting local-level technologies and upgrading skills. Considering the limited resources, introducing off-the-shelf technologies that are readily available from the outside will be difficult. There is a need to make an assessment of local technologies and to nurture them. Because people are familiar with these technologies, they will be able to build upon such knowledge.

This does not imply total reliance on indigenous technologies, which due to lengthy isolation and the limited knowledge base of local communities, may not be able to address new problems. Selectively adapting technologies from other situations will be particularly advantageous, as well as improving the science base of existing technologies. However, the fundamental thrust should be to involve local communities in the innovation and adaptation phases.

Focusing on less resource demanding options. In view of the limited resources situation, countries under this scenario will have to be very careful in choosing investment options, making sure that they are affordable and within the capacity of the countries. Adverse environmental conditions that affect productivity make

a number of investment options unattractive. In many cases, critical inputs such as water are extremely scarce. Much of the emphasis will be to pursue investment options that are less resource demanding.

Unbalanced development

As this scenario is characterized by institutional weaknesses, much of the thrust will be to build up institutional capacity to correct the imbalances. The overall approach for countries under this scenario will be to "improve fundamentals and change direction", with emphasis on the following:

- encouraging pluralistic institutional arrangements;
- improving the role of public sector agencies as facilitator to support the development of other institutions;
- upgrading technologies and skills.

Encouraging pluralistic institutional arrangements. The major strategic thrust under the scenario is to develop and support diverse institutional arrangements. In addition to local-level community organizations, there is a need to support and nurture the private sector, farmers' associations and civil society organizations so that they can play divergent roles in order to take full advantage of their unique capabilities. Wood production is one area that offers scope for substantial involvement of non-governmental players, although this will be limited to areas that have better growing conditions.

Community organizations, local bodies and the private sector may have some role in the provision of environmental services, especially in managing recreational areas in national parks or other similar areas. Moving up the value chain in recreation, particularly the management of visitor areas, nature trails, establishment and management of related infrastructure, could be better executed by the private sector rather than by public-sector agencies. However, the public sector will also need to play an important role to ensure that private sector management does not negatively impact the environment.

Improving the role of public-sector forestry agencies. The fact that in most countries an integrated approach is required for land use implies that forestry concerns are to be mainstreamed into the functions of agencies (ministries/departments) that address agriculture, range management, urban development and watershed management. In most cases, this would dictate against establishing a separate forestry department that would be directly responsible for the management of forests and woodlands. The thrust should be to develop a strong policy and technical unit that facilitates the integration of forests and forestry in all land uses, and which oversees the formulation of appropriate policies and legislation that enable the participation of various stakeholders.

Upgrading technologies and skills. Improved management of the environment will require substantial efforts to augment technologies and to upgrade the skills

of professionals. However, many countries, notwithstanding their relatively better economic situation, have not adequately invested in research and development nor upgraded the skills of professional and technical staff. In some countries, there is a substantial shortfall of qualified professionals in the national forestry system. Some of the steps required to improve the situation include:

- a detailed assessment of the requirements of professionals and development of the critical mass of expertise required to meet the anticipated needs;
- strengthening of the technical and professional skills of forestry staff through appropriate technical training programmes;
- assessment of the capacity of existing research and development institutions to develop and adapt technologies that address desertification, watershed degradation and other problems.

A number of countries are already using new technologies, such as irrigation with wastewater for afforestation, and there is substantial scope to improve and widely adopt such technologies. Arresting land degradation, afforestation of areas with poor soils, stabilization of sand dunes, improved management of watersheds, and sustainable management of recreation areas all require substantial investments to enhance knowledge in the biophysical and social sciences.

Balanced development

Many countries are striving to reach this ideal scenario, where economic and institutional development is well-balanced. However, these countries operate in a highly globalized situation in that their economies are closely intertwined with those of other countries. Policy processes and legislation will have to comply with regional and international agreements and take into account perceptions of other stakeholders outside the country. Participating in economic cooperation bodies such as the European Union suggests that countries need to be more competitive and efficient. Policies relating to energy, agriculture and environment at the regional level will have significant influence and it will be necessary for countries to adjust and adapt to the changing policies and legislation in these areas. Strong external linkages also increase competition in both domestic and external markets and this would necessitate continuous scaling up of the quality of products and services provided. The overall approach under this scenario could be summarized as "keep moving forward", with the focus being on the following:

- maintaining vibrancy of institutions and their adaptability;
- investing in human skills to improve efficiency and competitiveness;
- focusing on unique and high-value products and services.

Maintaining vibrancy of institutions and their adaptability. While institutions are reasonably well-developed under the "balanced development" scenario, they will have to remain vibrant and adaptable to survive and perform in a highly competitive environment. The ability of institutions to forge linkages with regional and international bodies will have to be strengthened substantially.

National policies and institutions will have to be adapted to regional and international agreements. At the same time, institutions will have to respond to the conflicting demands of domestic stakeholders. Balancing the divergent demands will require highly adaptable organizations that are able to learn quickly from their environment.

Investing in human skills. The success of institutions operating in a globalized environment will largely depend on enhancing human skills. This will require both deepening and broadening the knowledge base. With an increasing emphasis on an ecosystem approach to management, the skill set of land managers, including foresters, will have to be improved significantly. Social science skills will also need to be improved.

Focusing on unique and high-value products and services. As countries are exposed to increasing competition, they will need to focus on providing unique products and services, integrating local skills and improving technologies. Countries will be able to enhance income through adding value to local products. Focusing on unique products catering to high-value niche markets (for example some non-wood forest products, including medicinal plants) will be advantageous, especially to enhance rural employment and income.

SUMMARY OF PRIORITIES AND STRATEGIES

Enhancing the contribution of the forest sector through increased provision of goods and services requires substantial interventions at the policy and institutional level. It is important, however, to take into account the overall economic and institutional scenarios in designing the interventions. Table 6.1 provides an overview of the priorities and strategies that are relevant to the region and to the three scenarios.

TABLE 6.1
Priorities and strategies

Overall priorities and strategies	Scenario-specific priorities and strategies		
	Struggling to achieve development	**Unbalanced development**	**Balanced development**
Emphasis on the provision of environmental services Integrated approach to land management Policy and institutional adaptation Strengthen subregional, regional and international collaboration	Build up from the base: • Meeting people's basic needs sustainably • Building up local institutional capacity • Improving and adapting local-level technologies and upgrading skills • Focusing on less resource-demanding investment options	Improve fundamentals and change direction: • Support and strengthen pluralistic institutional arrangements • Improve the role of public-sector agencies as facilitator to support the development of other institutions • Upgrade technologies and skills	Keep moving forward: • Maintain vibrancy of institutions and their adaptability • Invest in strengthening human skills to improve efficiency and competitiveness • Focus on unique and high-value products and services

West and Central Asia is likely to witness important political, economic, social and environmental changes in the next 15 years, especially as countries become more integrated into the world economy and new opportunities and challenges emerge. Certainly, environmental issues will be at the forefront of policies relating to natural resource management. At the same time, several countries will have to continue grappling with poverty and making the best use of natural resources to address development needs. The priorities and strategies outlined under different scenarios are indicative and they need to be elaborated in the context of the specific economic and institutional conditions at the national and subnational levels. This is a task that needs to be pursued at the country level.

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Protective plantation managed as a forest park outside Damascus, Syrian Arab Republic

7. Summary and conclusions

The Forestry Outlook Study for West and Central Asia (FOWECA) was undertaken to provide an overview of the emerging state of the forestry sector taking into account the impact of the various driving forces. Specifically, a number of questions were raised (see Box 1.1) on the future roles of forests, woodlands and trees, the state of resources and how countries may enhance the flow of goods and services. This chapter summarizes the key findings and recommendations, answering the questions raised at the beginning of the study.

CHANGES IN THE STATE OF FOREST RESOURCES

The overall forestry situation in the West and Central Asia region in 2020 will largely depend on the proportion of countries in the different scenarios. The situation that may emerge in the next 15 years will be as diverse as it is today, although this will depend on the overall efforts to bring about changes in the economic and institutional fronts. Some of the likely developments regarding forest resources are summarized below.

Forest cover to stabilize and increase in most countries

On the whole, forest cover in most countries of the region is expected to stabilize and improve, mostly because the importance of agriculture (including animal husbandry) as the main source of income and employment is declining. Increasing urbanization and the development of the manufacturing and services sectors could reduce some of the pressures on forests and rangelands as horizontal expansion of agriculture slows down. Afforestation efforts, even though limited, would further help to stabilize and improve forest cover.

Conflict-related instability as a major problem

Continuing conflicts in the region will remain a major obstacle to improving the region's forestry situation. Wars have destroyed woodlands (including windbreaks, shelterbelts and avenue trees) either as collateral damage or as a deliberate act to minimize cover for combatants. Conflicts and consequent instability have undermined the ability of forestry organizations to manage forests and this has encouraged illegal logging in a number of countries.

Degradation of forests and rangelands

While the forest cover situation may stabilize and marginally improve, the degradation of forests and rangelands may persist in a number of countries, particularly those countries with sluggish economic growth, persistent poverty and a high proportion of people dependent on agriculture and animal husbandry. Notwithstanding the

fossil fuel wealth, the rural population in some of the countries will continue to use biomass as a main source of energy. Illegal collection of fuelwood and production of charcoal, which caters to the demand for energy but is also a source of income, is likely to persist, resulting in continued degradation.

ROLE OF FORESTS AND TREES IN THE REGION

Provision of environmental services as the primary objective

Provision of environmental services, as outlined below, will remain the major function of forests and trees in the future.

Arresting desertification. The preponderance of desert conditions prevailing in most of the region would imply that management of forests and woodlands gives emphasis to arrest land degradation and desertification. Protecting agricultural land and habitations from shifting sand dunes will be a major concern.

Afforestation of degraded areas. Land degradation is a major problem in several countries, and in many cases it has been caused by faulty land management practices, including the diversion of water for irrigated agriculture. Arresting further degradation would be a key priority requiring substantial investments in afforestation. Mobilization of resources and building up the necessary institutional and technical capacity to implement an effective programme of afforestation will require particular attention.

Urban forestry. Urbanization and the growth of some of the cities in the region as centres of international trade and commerce will require increased attention to urban forestry, especially to create green spaces for improving the environment and to enhance recreational amenities. Largely this will depend on the growth of income. There will also be situations where unplanned urbanization in low-income conditions could result in destroying green spaces and also degrading forests and woodlands in the adjoining areas.

Recreational use of forests and woodlands. A related priority will be to improve the recreational value of forests. Especially in the context of increased income, tourism, both domestic and international, is expected to grow rapidly, if there are no major instability and insecurity problems. Forests and woodlands will have to cater to the increasing demand for tourism, and efforts will have to be directed to prevent degradation with the increase in visitor pressure. The problem of increased recreational pressure is already evident in some of the countries and steps are necessary to make recreational use more environmentally friendly.

Conservation of biological diversity. Protecting the biodiversity in the region will be another priority. The region has 5 of the 32 global biodiversity hotspots and hosts a number of unique species of plants and animals. While most countries have

established a network of protected areas, considerable scope exists for improving their management. Weak institutional capacity has led to illegal hunting, especially in some of the Central Asian countries. While managed trophy hunting could generate income to local communities, currently trophy hunting is unorganized, and in many cases existing rules and regulations are not enforced nor is the income accruing to local people.

Declining importance of industrial wood production

With the exception of a few countries, the role of forests and trees in the production of industrial wood will be very limited. Even some of the countries where wood production was a key objective, this has declined in importance with provision of environmental services gaining primacy. The very low proportion of area under forests and other wooded land and especially the low productivity from unfavourable environmental conditions make wood production economically unviable.

Rapid increase in the demand for wood and wood products

The consumption of wood and wood products is likely to increase in the entire region, especially owing to the population growth, urbanization, increases in income and changes in lifestyles. During the next 15 years consumption is expected to grow at an average annual rate of 3 to 4 percent for sawnwood and 4 to 5 percent for wood-based panels and paper and paper board. Faster growth (in relative terms) is expected in Central Asia, whose economies have recovered in recent years. Currently, the region is a net importer of forest products, exceeding about US$12 billion (in 2004), and this is likely to double in real terms during the next 15 years. West and Central Asia will remain one of the most important net global forest product importing regions, largely because of its extremely poor resource base.

The scope for enhancing raw material supply from within the region is extremely limited and most of the demand will be met by increased imports from outside the region (mainly Europe, including the Russian Federation, followed by Southeast Asia). Some of the countries that are strategically located and have a large domestic market (for example, the Islamic Republic of Iran and Turkey) will be in a better position to develop forest industries based on imported industrial roundwood. The declining profitability of the wood industry in Europe could further speed up relocation of industries, to the advantage of some of the countries with low cost labour, stable investment climate and access to wood supplies. Although most countries may not have any natural advantage in producing wood, they may still be in a position to develop wood industries through their competitive advantage.

Demand for woodfuel to decline

Substitution with fossil fuels will reduce the overall demand for woodfuel in most countries. However, in a number of countries fossil fuels remain out of reach to some segments of the population, especially in the low-income groups. Collection of wood and production of charcoal will remain important sources of income for the

rural poor. Furthermore, in many countries charcoal use is expected to increase, as traditional cooking has become a status symbol. While most of the demand will be met through imports, there will also be increasing pressure on forests and woodlands. Legal restrictions are in place in some countries, but because of institutional weaknesses they have not curtailed illegal charcoal production.

Constraints in implementing sustainable forest management to persist

Although there may be some increase in forest cover, the ability of most countries to implement sustainable forest management will remain limited. This largely stems from policy and institutional weaknesses and, more importantly, the low level of investments. Even countries that are economically better off have not been able to build up institutional and technical capacities. Public-sector forestry organizations are poorly developed and continue to focus on law enforcement rather than actively promoting and facilitating the involvement of other stakeholders in the management of forests and woodlands.

OPTIONS AVAILABLE TO IMPROVE THE SITUATION

The priorities and strategies will differ between the countries depending on the current and emerging economic and institutional scenarios. As the overall economic and institutional environment changes, the demand for forest products and services and society's ability to provide them will undergo changes. While existing and future scenarios may result in very different demands on the forest sector, similarities would enable the adoption of common approaches in addressing the problems. Accomplishing sustainable forest management is a long-term goal for all countries, and the overall priorities and strategies will be somewhat similar. Such a broad framework could accommodate the conditions specific to the different countries and areas, and the priorities and strategies could be elaborated more precisely depending on the specific situation.

Overall priorities and strategies

Emphasis on environmental services. Considering the current environmental situation in the region – the arid and semi-arid conditions, the high level of desertification, declining agricultural and rangeland productivity, land degradation, loss of biodiversity, increasing water stress – provision of environmental services will be the most important concern for almost all countries. With the increasing proportion of people living in urban areas, improving the urban environment will continue to be another priority for a number of countries. Use of forests for recreational purposes – e.g. ecotourism – is another growth area, especially in view of the growth of domestic and international tourism.

What precisely should be given importance largely depends on the specific ecological conditions and the economic situation. For example, in many countries (most countries in the Arabian Peninsula, Afghanistan, Armenia, Iran and Turkmenistan) control of desertification, including sand-dune stabilization, will

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Use of forests for recreation and ecotourism is an area of growth: cedar forest reserve, Lebanon

be a priority. In several countries with mountainous topography, watershed management will be the most important objective. This will be particularly important in some of the countries where water is harnessed for irrigation and electricity generation (for example Iran, Kyrgyzstan, Tajikistan and Turkey).

Integrated approach to resource management. Considering the overall state of forest and tree resources in the region and the continuum of different land uses, accomplishing the objectives of management – whether the provision of environmental services or the production of wood and other products – warrants an integrated approach to resource management. This would imply that forestry will not be able to exist as a distinct sector, but that forestry concerns would be integrated with other land uses, especially agriculture and rangeland management – mainstreaming aspects such as growing and managing trees into all land uses.

Policy and institutional adaptations. The focus on provision of environmental services and the need to adopt an integrated approach to resource management would necessarily imply making substantial improvements in the policies and institutional arrangements relating to land use in the region. Traditionally, forest policies have largely focused on areas that are under the control of public-sector forestry agencies (State Forest Funds, as in the case of many former Soviet Republics). An increase

or decrease of goods (wood and non-wood products) and environmental services is often dependent on land that is not designated as forests. Adoption of an integrated land-use approach requires more broad-based policies, going beyond the domain of forests. Furthermore, many of the environmental problems such as the loss of biodiversity, desertification, soil erosion and watershed degradation stem from inappropriate use of agriculture and rangelands.

The formulation and implementation of policies for integrated land management requires that countries have more broad-based institutions. Revamping public-sector forestry agencies, which currently play a dominant role, will require a re-examination of the core values, functions and structures and to make appropriate changes. Public sector forestry agencies will have to work very closely with other sectors, especially agriculture, animal husbandry, urban development and tourism. The increasing role of the private sector, community groups and civil society organizations provides new opportunities for the provision of goods and environmental services. Collective action with other governmental and non-governmental agencies will require redefining the roles and responsibilities of each and developing appropriate policy and institutional frameworks. In some cases this would require substantial re-invention of existing institutions.

Subregional, regional and international collaboration. Ecological contiguity of countries and the similarities of the problems underscore the importance of intercountry collaboration at different levels. Sharing of information and technology and undertaking joint initiatives are particularly important to reduce costs and to enhance the effectiveness of resource management initiatives. Subregional and regional collaboration is particularly important in addressing problems such as fire and pest and disease incidence. The management of transboundary protected areas will particularly require stronger intercountry collaboration. Resource assessment, education, research and training are other areas that could significantly benefit (especially as they reduce costs) from subregional and regional collaboration.

Scenario-specific priorities

Differences in the current and emerging economic and institutional environment necessitates that countries fine-tune their priorities and strategies to make them relevant to the specific scenarios.

Struggling to achieve development. Countries passing through the "struggling to achieve development" scenario face substantial economic and institutional problems and, therefore, the priorities and strategies will have to acknowledge them. Severe financial and human resource constraints will be of particular concern. Forestry is unlikely to be a high-priority sector. The overall approach under this scenario could be summarized as "build up from the base" and focuses on the following:

- meeting people's basic needs sustainably;
- building up local institutional capacity;

- improving and adapting local-level technologies and upgrading skills;
- focusing on less resource-demanding investment options.

Unbalanced development. Although the resource situation is more favourable under this scenario, the rapid growth of a dominant sector (one that generates most of the economic surpluses) undermines the economic viability of the other traditional sectors. Production aspects of forests and forestry are unlikely to get much political attention. In addition, wood production will be economically less attractive in view of low productivity and the high real costs of inputs like water. Furthermore, the favourable economic situation provides an easy option of imports. Priorities and strategies will have to be designed taking this into account. Countries facing this scenario will have to focus on a strategy of "improve fundamentals and change direction", which involves the following components:

- encouraging pluralistic institutional arrangements;
- improving the role of public-sector agencies as facilitator in support of development of other institutions;
- increasing investments in upgrading technologies and skills.

Balanced development. Countries under this scenario are in a relatively better position because of their balanced economic and institutional development. However, they operate in a highly globalized environment in that their economies are closely intertwined with that of other countries. Policy processes and legislation will have to comply with regional and international agreements and take into account the perception of stakeholders outside the country. The participation in regional economic cooperation bodies such as the European Union implies the need to be more competitive and efficient. Policies relating to energy, agriculture and the environment at the regional level will have significant influence and it will be necessary for countries to adjust and adapt to the changing policies and legislation in these areas. Strong external linkages also increase the competition in both domestic and external markets and this would necessitate continuous scaling up of the quality of products and services provided. The overall approach under this scenario can be summarized as "keep moving forward", with the focus on:

- maintaining vibrancy of institutions and their adaptability;
- investing in human skills to improve efficiency and competitiveness;
- focusing on unique and high-value products and services.

FOLLOW-UP WORK

The next 15 years will witness significant political, economic, social and environmental changes in the region, especially as countries become more integrated into the world economy and new opportunities and challenges emerge. Undoubtedly, environmental issues will be at the forefront of policies relating to natural resource management. At the same time, a number of countries will have to continue addressing poverty and make the best use of natural resources

to tackle development challenges. Priorities and strategies need to be designed taking into account the overall economic and institutional constraints. The broad priorities and strategies outlined under the different scenarios are indicative, and they need to be elaborated and refined at the country level. The following are some of the areas for follow-up.

Strengthening national forest programmes

The Forestry Outlook Study for West and Central Asia provides a broad indication of the emerging opportunities and challenges and outlines the overall regional and global context of forestry development. Inevitably this involves some generalization and it is important that country-specific efforts are made to refine and adapt the findings. The national forest programmes provide a unique framework to take on board the findings of FOWECA and to elaborate them based on in-depth assessment of the specific situation.

Institutional improvements

FOWECA has clearly indicated the need for substantial strengthening of institutions dealing with forests and forestry in the region. In many cases existing institutions have failed to adapt to the overall changes and thus their ability to address current and emerging issues has been undermined significantly. Weaknesses are widespread in almost all institutions, including government forestry agencies, research organizations and educational and training institutions. There is, therefore, a strong case to review the institutional frameworks and where necessary to reinvent them to address the emerging challenges.

Capacity building in strategic planning

Although forestry is a long-term investment, the ability to develop and implement long-term strategic plans in the sector is poorly developed. The outlook process has made some effort to remedy this. However, substantial country level efforts are required to improve the capacity to undertake strategic planning, taking into account intersectoral linkages and visualising the long-term changes outside the sector. This is all the more important in the context of adopting an integrated approach to land and natural resources management.

Improving the information base

An important issue in improving strategic planning in the forest sector is the poor state of information on forests and forest products and services. Most countries in the region have not been able to provide recent information on the area under forests and other wooded land, the condition of forests and growing stock, as well as with production, consumption and trade of forest products. Although environmental services from forests are becoming important, here again information on biophysical and economic aspects of their provision is very poor. Improved planning for the development of the sector requires addressing this weakness.

Review and updating

A major challenge for all outlook studies is the change in the various assumptions that form the basis of the analyses. The complex interaction of the driving forces and the long time horizons enhances the uncertainties. Scenario analysis helps to some extent to identify the uncertainties and explore the implications of alternative paths of developments. However, there are several factors that could change in less predictable directions. This necessitates that planners and policy-makers understand the changes and reassess their implications on a regular basis.

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Preparing soil for seedlings, Turkmenistan

Bibliography

Akerlund, U. 2005. *Urban and peri-urban forestry and greening in West and Central Asia: experience, constraints and prospects.* FOWECA Thematic Study Report. FAO Forestry Department, Rome.

Asanbaeva, A. 2005. *Assessing access to forest resources for improving livelihood in Kyrgyzstan.* Field report prepared for the FOWECA thematic study on forestry and livelihood. FAO.

Broadhead, J., Bahdon, J. & Whiteman, A. 2001. *Past trends and future prospects for the utilization of wood energy*. Annex 2. *Woodfuel consumption modelling and results.* Working paper GFSOS/WP/05. Rome, FAO.

CAREC (Regional Environmental Centre for Central Asia). 2006. *Non-wood forest products in Central Asia and the Caucasus.* FOWECA Thematic Study. Almaty, Kazakhstan.

Conservation International. 2005. *Biodiversity hotspots*. Available at: www.biodiversityhotspots.org/xp/Hotspots/hotspots_by_region/

Czudek, R. 2005. *Wildlife issues and development prospects in West and Central Asia*. FOWECA Working Paper. Rome, FAO.

EFI. 2005. *Forest landscape restoration in Northern and Central Europe.* Available at: www.efi.fi/attachment/f5d80ba3c1b89242106f2f97ae8e3894/60aa43155d45f8440595e70d8a6aec03/Proc53_net.pdf

FAO. 2003. *Forestry Outlook Study for Africa, regional report – opportunities and challenges towards 2020*. FAO Forestry Paper No. 141. Rome.

FAO. 2004. *Global Forest Resources Assessment Update 2005 – terms and definitions*. Forest Resources Assessment Working Paper No. 83. Rome. Available at: www.fao.org/docrep/007/ae156e/ae156e00.htm

FAO. 2005. *The State of Food and Agriculture: agricultural trade and poverty – can trade work for the poor*. Rome.

FAO. 2006a. *Global Forest Resources Assessment 2005*: *progress towards sustainable forest management.* FAO Forestry Paper No. 147. Rome, FAO.

FAO. 2006b. *FAOSTAT database*. Rome. Available at: www.faostat.fao.org/faostat

Fisher, R.J., Schmidt, K., Steenhof, B. & Akenshaev, N. 2004. *Poverty and forestry: a case study of Kyrgyzstan with reference to other countries in West and Central Asia*. LSP Working Paper No. 13. FAO.

Hofer, D. 2002. *The lion's share of the hunt – trophy hunting and conservation: a review of the legal Euroasian tourist hunting market and trophy trade under CITES.* TRAFFIC Europe.

Horak, S. 2004. *Central Asia: problems and perspectives of international tourism*. Presented at the conference "Tourism and Regional Development", Tábor, Czech Republic, May. Available at: slavomirhorak.euweb.cz/konference_Tabor2004.htm

Iran Daily. 2000. The watershed situation in Iran. 6(1662).

Lebedys, A. 2004. *Trends and current status of the contribution of the forestry sector to national economies.* Forest Finance Working Paper FSFM/ACC/07. Rome, FAO.

Magin, C. 2005. *World heritage thematic study for Central Asia: a regional overview*. IUCN/UNESCO/UNEP-WCMC. Available at: www.iucn.org/themes/wcpa/pubs/pdfs/heritage/centralasia.pdf

Malaysian Timber Industry Board. 2006. *Maskayu,* Vol. 4, April.

Millennium Ecosystem Assessment. 2005. *Ecosystems and human well-being: synthesis.* Washington DC, Island Press.

Mubin, S.F. 2004. Outlook of the paper industry in the GCC. *Pulp & Paper International*, November.

Nasrat, A. & Babak, B. 2005. *Saving Afghanistan's precious trees.* Environment News Service. Available at: www.ens-newswire.com

Osepashvili, I. 2005. *Land use dynamics and the changes in policy, legal and institutional framework in Central Asia and the Caucasus countries.* FOWECA Thematic Report.

Royal Society for the Conservation of Nature, Jordan. 2005. *Overview*. Available at: www.rscn.org.jo

Sakari, M. & Vahabi, A. 2004. A survey on Afghanistan and Iraq wars effects on eco-tourism industry in Northern Iran. *In* F.D. Pineda, C.A. Brebbia & M. Mugica, eds. *Sustainable tourism*. WIT Press. Available at: www.witpress.com

Savcor Indufor. 2005. *Ensuring sustainability of forests and livelihoods through improved governance and control of illegal logging for economies in transition.* Summary report prepared for the World Bank.

Schaar, E. 2001. Central Asia's Dead Sea – the Aral Sea's slow demise. *Harvard International Review*, 23(3): 12. Available at: hir.harvard.edu/articles/934

Shell International. 2001. *Energy needs, choices and possibilities: scenarios to 2050*. Global Business Environment, Shell International.

UN. 2005. *United Nations Common Data Base (UNCDB)*. Available at: unstats.un.org/unsd/cdb/cdb_help/cdb_quick_start.asp

UNCCD. 2003. *Subregional action programme for the Central Asian Countries on combating desertification within the UNCCD context*. Available at: www.unccd.int/actionprogrammes/asia/subregional/2003/srapcd-eng.pdf

UNDP. 2002. *The Arab Human Development Report 2002*. Regional Bureau for Arab States. New York.

UNDP. 2005a. *The Arab Human Development Report 2004 – towards freedom in the Arab world.* Regional Bureau for Arab States. New York.

UNDP. 2005b. *Central Asia Human Development Report: bringing down barriers: regional cooperation for human development and human security.* UNDP Regional Bureau for Europe and Commonwealth of Independent States.

UNECE & FAO. 2005. *European Forest Sector Outlook Study – main report*. Geneva, United Nations.

UNEP. 2002. *Global Environment Outlook 3* – past, present and future perspectives. London, Earthscan. Available at: www.unep.org/geo

UNEP-WCMC. 2005. *Extent of terrestrial protected areas (national IUCN category I to VI areas).* Available at: sea.unep-wcmc.org

Wafa, D. 2002. The rape of Kunar. *Afghan Recovery Report,* No. 1, 16 April. Available at: www.iwpr.net

Whiteman, A. 2005. Recent trends and development in global markets for pulp and paper. Paper presented to Paperex 2005 – International Technical Conference on Pulp and Paper Industry, New Delhi, India, 3–5 December. Available at: ftp://ftp.fao.org/docrep/fao/008/af303e/af303e00.pdf

World Bank. 2005. *Anatolia watershed rehabilitation project.* Available at: worldbank.org.tr

World Bank. 2006. *World development indicators database.* Washington, DC.

WRI. 2005. Watersheds of the world 2005. *Earth Trends Data Tables*. Available at: earthtrends.wri.org/pdf_library/data_tables/wat_2005.pdf

World Tourism Organization. 2005. *Facts and figures:* international tourist arrivals & tourism receipts by country. Available at: www.world-tourism.org/facts/eng/ITA&TR.htm

WWF. 2005. *Kazakh upland* (PA0811). Available at: www.worldwildlife.org/wildworld/profiles/terrestrial/pa/pa0811_full.html

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Forest in winter, Azerbaijan

Annex

TABLE 1
Overview of land use

Country/area	Land area *('000 ha)*	Arable land		Forest and other wooded land		Permanent pasture	
		Area *('000 ha)*	% of total land area	Area *('000 ha)*	% of total land area	Area *('000 ha)*	% of total land area
Armenia	2 820	495	17.6	328	12.9	835	29.6
Azerbaijan	8 260	1 783	21.6	990	12.0	2 683	32.5
Georgia	6 949	799	11.5	2 810	40.4	1 940	27.9
Kazakhstan	269 970	21 535	8.0	18 959	7.0	185 098	68.6
Kyrgyzstan	19 180	1 345	7.0	1 182	6.2	9 365	48.8
Tajikistan	14 060	930	6.6	552	3.9	3 198	22.8
Turkmenistan	46 993	1 850	3.9	4 127	8.8	30 700	65.3
Uzbekistan	41 424	4 484	10.8	4 199	10.1	22 219	53.6
Central Asia	**409 656**	**33 221**	**8.1**	**33 147**	**8.1**	**256 038**	**62.5**
Afghanistan	65 209	7 910	12.1	867	1.3	30 000	46.0
Bahrain	71	2	2.8	0	0.0	4	5.6
Cyprus	924	72	7.8	388	42.0	4	0.4
Iran, Islamic Republic of	163 620	15 020	9.2	16 415	10.0	44 000	26.9
Iraq	43 737	5 750	13.1	1 749	4.0	4 000	9.1
Jordan	8 893	295	3.3	135	1.5	742	8.3
Kuwait	1 782	13	0.7	6	0.3	136	7.6
Lebanon	1 023	170	16.6	242	23.7	16	1.6
Oman	30 950	38	0.1	1 305	4.2	1 000	3.2
Qatar	1 100	18	1.6	1	0.1	50	4.5
Saudi Arabia	214 969	3 600	1.7	36 883	17.2	170 000	79.1
Syrian Arab Republic	18 378	4 593	25.0	496	2.7	8 338	45.4
Turkey	76 963	25 938	33.7	20 864	27.1	13 167	17.1
United Arab Emirates	8 360	75	0.9	316	3.8	305	3.6
Yemen	52 797	1 538	2.9	1 955	3.7	16 065	30.4
West Asia	**688 776**	**65 032**	**9.4**	**81 622**	**11.9**	**287 827**	**41.8**
Total West and Central Asia	**1 098 432**	**98 253**	**8.9**	**114 769**	**10.5**	**543 865**	**49.5**

Source: FAO, 2006b.

TABLE 2
Extent of forest and other wooded land 2005

Country/area	Forest		Other wooded land		Total
	Area ('000 ha)	% of land area	Area ('000 ha)	% of land area	
Armenia	283	10	45	1.5	2 980
Azerbaijan	936	11.3	54	0.6	8 660
Georgia	2 760	39.7	50	0.7	6 970
Kazakhstan	3 337	1.2	15 622	5.7	272 490
Kyrgyzstan	869	4.5	313	1.6	19 990
Tajikistan	410	2.9	142	1.0	14 255
Turkmenistan	4 127	8.8	0	0.0	48 810
Uzbekistan	3 295	8	904	2.0	44 740
Central Asia	**16 017**	**3.8**	**17 130**	**4.1**	**418 895**
Afghanistan	867	1.3	-		65 209
Bahrain	n.s.	0.6	0	0.0	71
Cyprus	174	18.9	214	23.1	925
Iran, Islamic Republic of	11 075	6.8	5 340	3.2	164 820
Iraq	822	1.9	927	2.1	43 832
Jordan	83	0.9	52	0.6	8 921
Kuwait	6	0.3	0	0.0	1 782
Lebanon	136	13.3	106	10.2	1 040
Oman	2	n.s.	1 303	6.1	21 246
Qatar	n.s.	n.s.	n.s.		1 100
Saudi Arabia	2 728	1.3	34 155	15.9	214 969
Syrian Arab Republic	461	2.5	35	0.2	18 518
Turkey	10 175	13.2	10 689	13.8	77 482
United Arab Emirates	312	3.7	4	0.0	8 360
Yemen	549	1	1 406	2.7	52 797
West Asia	**27 390**	**4.0**	**54 231**	**8.0**	**681 072**
Total West and Central Asia	**43 408**	**3.9**	**71 361**	**6.5**	**1 099 967**
Total world	**3 952 025**	**30.3**	**1 375 829**	**10.3**	**13 418 518**

Source: FAO, 2006a.

TABLE 3
Growing stock in forests and woodlands, 2005

Country/area	Forest				Other wooded land		
		Growing stock				Growing stock	
	Area *('000 ha)*	By area *(m^3/ha)*	Total *(million m^3)*	of which is commercial *(%)*	Area *('000 ha)*	By area *(m^3/ha)*	Total *(million m^3)*
Armenia	283	125	36	-	45	22	1
Azerbaijan	936	136	127	20.4	54	-	-
Georgia	2 760	167	461	26.2	50	20	1
Kazakhstan	3 337	109	364	0	15 622	1	17
Kyrgyzstan	869	34	30	0	313	-	-
Tajikistan	410	12	5	0	142	0	0
Turkmenistan	4 127	4	14	0	0		0
Uzbekistan	3 295	7	24	0.1	904	-	-
Central Asia	**16 017**	**66**	**1 061**	**14**	**17 130**		**19**
Afghanistan	867	16	14	40	-	-	-
Bahrain	n.s.	-	-	-	0	-	-
Cyprus	174	46	8	39	214	-	-
Iran, Islamic Republic of	11 075	48	527	78.9	5 340	-	-
Iraq	822	-	-	-	927	-	-
Jordan	83	30	2	-	52	-	-
Kuwait	6	-	-	-	0	-	-
Lebanon	136	36	5	-	106	9	1
Oman	2	-	-	-	1 303	-	-
Qatar	n.s.	-	-	-	n.s.	-	-
Saudi Arabia	2 728	8	23	0	34 155	5	171
Syrian Arab Republic	461	-	-	-	35	-	-
Turkey	10 175	138	1 400	86.6	10 689	-	-
United Arab Emirates	312	49	15	0	4		n.s.
Yemen	549	9	5	-	1 406	9	12
West Asia	**27 390**	**-**	**-**	**-**	**54 231**	**-**	**-**
Total West and Central Asia	**43 408**	**70**					
Total world	**3 952 025**	**110**					

Source: FAO, 2006a.

TABLE 4
Change in extent of forest and other wooded land, 1990–2005 *('000 ha)*

Country/area	Forest			Other wooded land		
	1990	2000	2005	1990	2000	2005
Armenia	346	305	283	45	45	45
Azerbaijan	936	936	936	54	54	54
Georgia	2 760	2 760	2 760	53	51	50
Kazakhstan	3 422	3 365	3 337	13 049	14 765	15 622
Kyrgyzstan	836	858	869	283	303	313
Tajikistan	408	410	410	142	142	142
Turkmenistan	4 127	4 127	4 127	0	0	0
Uzbekistan	3 045	3 212	3 295	-	-	904
Central Asia	**15 880**	**15 973**	**16 017**	**13 626**	**15 360**	**17 130**
Afghanistan	1 309	1 015	867	-	-	-
Bahrain	n.s.	n.s.	n.s.	0	0	0
Cyprus	161	173	174	-	214	214
Iran, Islamic Republic of	11 075	11 075	11 075	5 340	5 340	5 340
Iraq	804	818	822	1 245	1 033	927
Jordan	83	83	83	55	54	52
Kuwait	3	5	6	0	0	0
Lebanon	121	131	136	-	117	106
Oman	2	2	2	1 303	1 303	1 303
Qatar	n.s.	n.s.	n.s.	n.s.	n.s.	n.s.
Saudi Arabia	2 728	2 728	2 728	34 155	34 155	34 155
Syrian Arab Republic	372	432	461	35	35	35
Turkey	9 680	10 052	10 175	10 905	10 728	10 689
United Arab Emirates	245	310	312	4	4	4
Yemen	549	549	549	1 406	1 406	1 406
West Asia	**27 132**	**27373**	**27390**	**54 448**	**54 389**	**54 231**
Total West and Central Asia	**43 013**	**43 346**	**43 408**	**68 074**	**69 749**	**71 361**
Total world	**4 077 291**	**3 988 610**	**3 952 025**			

Source: FAO, 2006a.

TABLE 5
Area of planted forests, 1990–2005 *('000 ha)*

Country/Area	1990	2000	2005
Armenia	14	11	10
Azerbaijan	20	20	20
Georgia	54	60	60
Kazakhstan	1 034	1 056	909
Kyrgyzstan	46	59	66
Tajikistan	76	66	66
Turkmenistan	-	-	-
Uzbekistan	30	51	61
Central Asia	**1 274**	**1 323**	**1 192**
Afghanistan	-	-	-
Bahrain	n.s	n.s	n.s
Cyprus	3	3	5
Iran, Islamic Republic of	616	616	616
Iraq	15	15	13
Jordan	40	40	40
Kuwait	3	5	6
Lebanon	-	-	8
Oman	2	2	2
Qatar	-	-	-
Saudi Arabia	-	-	-
Syrian Arab Republic	175	234	264
Turkey	1 839	2 304	2 537
United Arab Emirates	245	310	312
Yemen	-	-	-
West Asia	**2 938**	**3 529**	**3 803**
Total West and Central Asia	**4 212**	**4 852**	**4 995**

Source: FAO, 2006a.

TABLE 6
Population change, 1980–2020

Country/area	Total population ('000 people)					
	1980	1990	2000	2005	2010 (projected)	2020 (projected)
Armenia	3 096	3 545	3082	3 016	2 979	2 917
Azerbaijan	6 161	7 212	8143	8 411	8 745	9 381
Georgia	5 073	5 460	4720	4 474	4 315	4 089
Kazakhstan	14 919	16 500	15033	14 825	14 861	15 036
Kyrgyzstan	3 627	4 395	4952	5 264	5 623	6 413
Tajikistan	3 953	5 303	6159	6 507	7 107	8 926
Turkmenistan	2 861	3 668	4502	4 833	5 214	6 114
Uzbekistan	15 952	20 515	24724	26 593	28 877	34 288
Central Asia	**55 642**	**66 598**	**71 315**	**73 923**	**77 721**	**87 164**
Afghanistan	15 209	14 606	23 735	29 863	35 955	50 448
Bahrain	347	493	672	727	797	944
Cyprus	611	681	786	835	882	974
Iran, Islamic Republic of	39 330	56 674	66 365	69 515	74 540	86 500
Iraq	14 092	18 514	25 075	28 807	33 100	44 425
Jordan	2 225	3 254	4 972	5 703	6 429	8 106
Kuwait	1 375	2 143	2 230	2 687	3 059	3 774
Lebanon	2 698	2 741	3 398	3 577	3 789	4 231
Oman	1 187	1 843	2 442	2 567	2 913	3 746
Qatar	229	467	606	813	900	1 072
Saudi Arabia	9 604	16 379	21 484	24 573	28 100	36 842
Syria	8 978	12 843	16 813	19 043	21 754	27 991
Turkey	4 6316	57 300	68 234	73 193	78 509	89 114
United Arab Emirates	1015	1 868	3 247	4 496	5 060	6 287
Yemen	8197	12 086	17 937	20 975	24 888	35 821
West Asia	**151 413**	**201 892**	**257 996**	**287 374**	**320 675**	**400 275**
Total West and Central Asia	**207 055**	**268 490**	**329 311**	**361 297**	**398 396**	**487 439**

Source: UN, 2005.

TABLE 7
GDP per capita, 1990–2004

Country/region	GDP per capita by purchasing power parity *(current US$)*[a]			
	1990	**1995**	**2000**	**2004**
Armenia	2 727	1 671	2 422	4 222
Azerbaijan	–	1 673	2 571	4 175
Georgia	3 672	1 329	1 990	2 977
Kazakhstan	4 664	3 318	4 594	7 494
Kyrgyzstan	1 994	1 123	1 560	1 928
Tajikistan	1 882	758	803	1 193
Turkmenistan	4 674	2 843	3 668	7 021
Uzbekistan	–	1 233	1 516	1 871
Average Central Asia	**3 269**	**1 744**	**2 391**	**3 860**
Afghanistan	–	–	–	–
Bahrain	11 672	13 489	15 870	19 109b
Cyprus	11 213	14 758	20 041	22 900
Iran, Islamic Republic of	3 752	4 876	5 576	7 546
Iraq	–	–	–	–
Jordan	3 148	3 736	3 829	4 571
Kuwait	–	16 959	15 766	18 073b
Lebanon	1 777	3 777	4 162	5 320
Oman	9 494	10 957	12 480	13 795[b]
Qatar	–	–	–	–
Saudi Arabia	9 754	11 531	12 700	14 022
Syrian Arab Republic	2 164	2 912	3 345	3 945
Turkey	4 484	5 383	6 519	7 710
United Arab Emirates	21 041	18 066	–	–
Yemen	525	694	799	888
Average West Asia	**7 194**	**8 803**	**9 215**	**10 601**
Average for West and Central Asia	**5 231**	**5 273**	**5 803**	**7 231**

Source: World Bank, 2006.

[a] –: not available.

[b] Data for 2003.

TABLE 8
Ownership of forest and other wooded land, 2000

Country/Area	Forest				Other wooded land			
	Total ('000 ha)	Public (%)	Private (%)	Other (%)	Total ('000 ha)	Public (%)	Private (%)	Other (%)
Armenia	305	100	0	0	44	100	0	0
Azerbaijan	936	99.9	0	0	54	100	0	0
Georgia	2 760	100	0	0	51	100	0	0
Kazakhstan	3 365	100	0	0	14 765	100	0	0
Kyrgyzstan	858	100	0	0	303	100	0	0
Tajikistan	410	87.8	0	12.2	142	47.2	52.8	0
Turkmenistan	4 127	100	0	0	-	-	-	-
Uzbekistan	3 212	100	0	0	-	-	-	-
Central Asia	**16 012**	**99.7**	**0**	**0.3**	**15 359**	**99.5**	**0.5**	**0**
Afghanistan	1 015	100	0	0	-	-	-	-
Bahrain	n.s.	100	0	0	-	-	-	0
Cyprus	173	61.2	38.8	0	214	23.7	76.3	0
Iran, Islamic Republic of	11 075	100	0	0	5 340	100	0	0
Iraq	818	100	0	0	1 033	0	0	100
Jordan	83	85.5	0	14.5	54	55.6	22.2	22.2
Kuwait	5	100	0	0	-	-	-	-
Lebanon	131	38.2	60.3	1.5	117	13.7	79.9	6.4
Oman	2	-	-	100	1 303	100	-	-
Qatar	n.s.	-	-	-	n.s.	-	-	-
Saudi Arabia	2 728	99.3	0.7	0	34 155	99.6	0.4	0
Syrian Arab Republic	432	100	-	-	35	100	-	-
Turkey	10 052	99.9	0.1	0	10 728	100	n.s.	0
United Arab Emirates	310	100	0	0	4	100	0	0
Yemen	549	5	80	15	1 406	5	80	15
West Asia	**27 373**	**97.4**	**2.3**	**16.0**	**54 389**	**94.9**	**2.8**	**2.3**
Total West and Central Asia	**43 385**	**98.2**	**1.4**	**0.3**	**69 748**	**95.9**	**2.3**	**1.8**
Total World	**3 988 649**	**84.4**	**13.3**	**2.4**	**1 448 648**	**89.8**	**3.8**	**6.5**

Source: FAO, 2006a.

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FAO FORESTRY PAPER

People, forests and trees in West and Central Asia

Outlook for 2020

In West and Central Asia, governments, the private sector, communities, farmers and civil society organizations are making substantial efforts to improve the management of forest and tree resources. However, most countries face enormous challenges in this regard. This publication, the main report of the Forestry Outlook Study for West and Central Asia (FOWECA), provides a long-term perspective of changes in the forest sector. Implemented in partnership with the countries, the study covered 23 countries in West Asia, Central Asia and the southern Caucasus. This report outlines the probable developments, including broader regional and global issues that need to be taken into account in developing national policies and programmes. It then discusses what needs to be done to enhance the contribution of forests and trees to society. It focuses particularly on probable development scenarios, their implications for society in terms of the availability of goods and services, and the priorities and strategies that may be pursued to improve the situation. This analysis will be of particular interest to planners, investors and decision-makers at the regional, subregional and national levels.

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