ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY II

WORKING PAPER SERIES

Working Paper No. APFSOS II/WP/2009/28

PAKISTAN FORESTRY OUTLOOK STUDY

by

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FOOD AND AGRICULTURE ORGANIZATION OF THE UNITED NATIONS
REGIONAL OFFICE FOR ASIA AND THE PACIFIC

Bangkok, 2009

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Contents

INFORMATION NOTE ON THE ASIA-PACIFIC FORESTRY SECTOR OUTLOOK STUDY

The Asia-Pacific Forestry Sector Outlook Study (APFSOS) is a wide-ranging initiative to gather information on, and examine, the evolution of key forestry issues as well as to review important trends in forests and forestry. The main purpose of the study is to provide a better understanding of the changing relationships between society and forests and thus to facilitate timely policy reviews and reforms in national forest sectors. The specific objectives are to:

1. Identify emerging socio-economic changes impacting on forest and forestry
2. Analyze probable scenarios for forestry developments to 2020
3. Identify priorities and strategies to address emerging opportunities and challenges

The first APFSOS was completed in 1998, with an outlook horizon to 2010. During its twenty-first session, held in Dehradun, India, in April 2006, the Asia-Pacific Forestry Commission (APFC) resolved to update the outlook extending the horizon to 2020. The study commenced in October 2006 and is expected to be completed by September 2009.

The study has been coordinated by the Food and Agriculture Organization of the United Nations (FAO), through its regional office in Bangkok and its headquarters in Rome, and implemented in close partnership with APFC member countries with support from a number of international and regional agencies. The Asian Development Bank (ADB), the International Tropical Timber Organization (ITTO), and the United Kingdom's Department for International Development (DFID) provided substantial financial support to implement the study. Partnerships with the Asia-Pacific Association of Forest Research Institutes (APAFRI) and the Secretariat of the Pacific Community (SPC) supported the organizing and implementing of national focal points' workshops and other activities, which have been crucial to the success of this initiative. The contributions of many other individuals and institutions are gratefully acknowledged in the main APFSOS report.

Working papers have been contributed or commissioned on a wide range of topics. These fall under the following categories: country profiles, sub-regional studies and thematic studies. Working papers have been prepared by individual authors or groups of authors and represent their personal views and perspectives; therefore, opinions expressed do not necessarily reflect the views of their employers, the governments of the APFC member countries or of FAO. Material from these working papers has been extracted and combined with information from a wide range of additional sources to produce the main regional outlook report.

Working papers are moderately edited for style and clarity and are formatted to provide a measure of uniformity, but otherwise remain the work of the authors. Copies of these working papers, as well as more information on the Asia-Pacific Forestry Sector Study, can be obtained from:

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EXECUTIVE SUMMARY

This paper is a contribution to the Forestry Outlook for the Asia-Pacific region, which is being developed by FAO. But this does not reduce its value in any way for internal use. Rather, the expectation is that this would be used extensively in all areas of policy and strategic planning for forestry including development of the Pakistan Forestry Vision 2030, review and formulation of national, provincial and other sectoral policies, and legal and institutional frameworks of forestry. This paper will also help in prioritization for investment planning through development and implementation of forestry programmes and projects.

Pakistan is a forest-poor country, mainly due to arid and semi-arid climate in large parts of the country. According to the Forestry Sector Master Plan (FSMP), 1992, natural forests accounted for 4.2 million ha (4.8%), irrigated plantations occupied 103,000 ha (0.117%) and rangelands covered 28.507 million ha (32.40%) out of the total land area of 87.98 million ha (879,800 km^2). FAO (2007) recorded that the total area of forests in the country was 4.34 million ha (5.01%) out of which 3.44 million ha were state owned; tree cover on farmlands and private forests was 0.781 million ha (0.887%). Studies were conducted by the IGF office in 2002-2003 and 2004 to review the situation. The area of natural forests and state-owned plantations remained the same but there was a 3.86% increase in the area of tree cover on farmlands.

Most of the forest area is in the northern part of the country i.e. North West Frontier Province (NWFP), Northern Areas and Azad Jammu & Kashmir (AJK) and comprises coniferous and scrub forest. The main types of forests in other parts include juniper, chilghoza, scrub, riverine and mangrove forests. Irrigated plantations have been raised mainly in Punjab and Sindh provinces. Rangelands are of different types too and are distributed thoughout the country.

Besides the limitations of dry climate in most parts of the country, human and natural factors impact forests, plantations and rangelands in Pakistan. The human factors include societal characteristics; demographic, political, institutional, economic and technological changes; demands for forest products; and globalization. The natural factors include earthquakes, floods, droughts, global warming and climate change but human activities contribute to aggravating their extent and impacts.

Past trends and the current state of forests and forestry indicate that large-scale deforestation and degradation of natural forests have occurred. It continues unabatedly at the rate of 0.75% per year (FAO, 2007) due to many direct and underlying causes. Arid climate; overexploitation of forest resources coupled with lack of regeneration; forest land use change (in particular for agriculture); abstraction and extraction of river waters without caring for the needs of forest ecosystems downstream; competing uses and inefficient use of water; inefficient use of wood; and forest fires are the main causes of this situation.

The underlying causes include rapid increase in population, i.e. beyond the carrying capacity of forests and other resources on which forestry depends (for example low priority is given to the forestry sector in the national agenda); controversial land tenure; lack of community participation; weak enforcement of policies and laws; weak institutional framework; and lack of a proactive approach.

Rapid increase in the population has been observed during the last 60 years. It had increased from 33.74 million in 1951 to 132.35 million in 1998 and is currently estimated at 162.39 million (Population Census Organisation of Pakistan). Significant changes have also taken place in people's lifestyles. They are switching over to better lifestyles that demand enhanced use of fuelwood, and timber for construction and furniture. The increase in human population

and change in lifestyles catalyse the other human factors mentioned in the preceding paragraph.

Pakistan has seen medium to high economic growth in the past 60 years. Currently, it is around 7% annually. Housing and settlements have been developed on a large scale due to demand created by rapid increase in human population and economic growth. As a result, certain forest areas have been cleared of forests and the neighbouring forests have been degraded and deforested because of overexploitation of forest resources, mostly illegally, by local people.

Similarly, communication infrastructure including roads, highways, motorways, harbours, sea ports; and energy corridors such as high tension power lines, natural gas and oil transmission pipe lines, have been developed through the forests that have involved felling of trees, regular clearance of vegetation and fragmentation of wildlife habitats. Exploration and exploitation of oil and gas in forests or protected areas such as Kirther National Park, Dureji Wildlife Sanctuary and Torshor Juniper Forest and mining and quarrying of stones in forests, for example Margallah Hills National Park have had adverse impacts.

The rate of deforestation has been increasing. However, there is great variation in the estimates made by different organizations, in this respect. FAO (2007) recorded that on average an area of 31,658 ha (-0.75%) of natural forests is deforested annually. However, annual average increase in the standing volume of farmland trees is 3.86%.

Withdrawal of waters from three rivers by India through the Indus Water Treaty have had a catastrophic effect already on the mangroves, riverine forests and irrigated plantations in Pakistan. Mangroves and riverine forests have been impacted due to abstraction and extraction of river waters. Juniper forests have suffered from overexploitation by humans and long periods of recurring droughts. The status of these two ecosystems is threatened in Pakistan.

The supply of irrigation water to irrigated plantations has decreased substantially. Inefficient irrigation remains another concern. The heaviest deforestation and degradation of natural forests has, however, occurred in the mountains in northern parts of Pakistan because of overexploitation for timber, fuelwood, grazing of livestock as well as conversion of forests into agricultural lands.

The energy crisis is worsening in Pakistan. Most people (about 67.5%)(Population Census Organisation of Pakistan) are still living in rural areas and depend on firewood for domestic needs. Many urban areas still do not have alternative sources of house energy and, thus, use fire wood. Despite supplemental supply of fuelwood from the trees on farmlands, the forests and other sources of fuelwood are unable to meet the demand for fuelwood on a sustainable basis.

Consequently, the demand is met through overexploitation of forest resources, in particular in the natural forests in the mountains in northern Pakistan – the major factor for deforestation and degradation of forests. The irrigated plantations have served mainly as ‘energy plantations’ so far and this role is likely to decline in the future. The concept of energy plantations has been the subject of discussion for a long time but has not received serious attention for implementation.

The parameters of technological changes are technical (mainly production related): felling, extraction, transportation, marketing, and utilization. The forestry sector has lagged behind in technical improvements in particular but some technological changes have taken place that have had a negative effect on sustainability e.g. electric sawing of illegally removed timber in the villages adjoining forests and irrigated plantations. Use of smaller size timber is now

possible and technology for biofuels and generation of power is now available and may be considered for use in the country.

Technologies for value addition of non-wood forest products (NWFPs) are likely to be adopted. Real progress has been made in the development and marketing of alternatives for wood and NWFPs. However, promotion of their use is dependent on economics, i.e. cost and affordability.

In the context of export of wood products and NWFPs, multilateral environmental agreements (MEAs) are important for understanding the thinking of the internal community regarding the importance of management for conservation and sustainable use of natural resources and the environment and international trade.

The most relevant MEAs to the forestry sector to which Pakistan is a member or party include the WTO, CBD, CITES, CMS, WHC, Ramsar Convention, UNCCD, and UNFCCC. UNESCO's MAB Programme and the regional initiatives, e.g. ICIMOD and SACEP are also important. The MEAs and other multilateral cooperative arrangements have at least helped the country in understanding global trends, although the country could have benefited much more by implementing them fully, if constraints had been removed.

Climate change has emerged as a priority agenda of the G-8 countries and the United Nations. Pakistan, being a developing country, is not included in Annex-B of the Kyoto Protocol for reduction of emissions but it could benefit from the Clean Development Mechanism established under the Protocol in accessing financial resources for forestation and mitigation measures. This window has not been utilized by Pakistan for forestry-related initiatives so far although there is a great potential.

As regards market orientation policies, the areas relevant to Pakistan are import of paper, paper pulp and timber in large quantities, import and export of medicinal, aromatic and economic plants, and export of wood furniture, handicrafts and edible pine (Chalghoza nuts). Certification of forests and forest products is practiced in the country. Certification can help in boosting exports and getting premium prices. However this would also mean adhering to the principles and practices of certification.

Pakistan is not a member of the International Tropical Timber Organization (ITTO). However, the World Trade Organisation (WTO) framework and mechanisms are relevant. Pakistan, as an importer of paper pulp, paper and timber and an exporter of wood furniture and handicrafts is likely to benefit from liberalization of trade in forest products.

The consequences arising from the existing state of affairs is that acute shortage of wood and NWFPs is being experienced in the country and the scope and extent of environmental services is diminishing greatly. The prices of wood and NWFPs have seen big jumps periodically. The watershed value of forests and rangelands has decreased, exacerbating the soil erosion, quick drainage of water, and sedimentation of mega dams as well as floods.

Rangelands are mostly degraded due to overgrazing and receive no investment or input for maintaining their full potential of productivity. The management of range lands, if any, is confined to those in the control of forest departments, which make up a small percentage of the rangelands in the country. The user component, i.e. livestock, is supported by the livestock departments of the same provincial departments but the two departments work in isolation.

Forest biodiversity has suffered and declined drastically in all forest ecosystems, mainly due to relegation in traditional forestry management, and loss and degradation of forest habitats. Comparatively, the loss of biodiversity is lower in forests that have been designated as

various protected areas under the wildlife laws. However, the multiple designations with conflicting objectives have had their own problems.

The demand for wood far exceeds the current level of sustainable domestic supplies. Total wood demand in 2007 was 43.7 million m^3 out of which timber constituted 12 million m^3 and fuelwood 32 million m^3. Sustainable supplies (annual growth rate) were only 14.4 million m^3. Thus there was a gap of 29.3 million m^3 (FAO, 2007) in demand and supply, which was mainly being met by overexploiting the forest resources and partly through import of paper products and timber. There will be big gap in local supply and demand of wood to the year 2020.

The major forest-based industries include paper, furniture, construction wood items, matches, sports goods, packing cases, and wooden articles used in mining. The full potential of small and medium enterprises (SMEs) has not been exploited so far. There are no exclusive industrial plantations in the public sector or the private sector so far. The size of round wood for industrial use has reduced in certain cases with improvement in technology, which has helped in reducing the rotation age of the relevant timbers.

The future of forest industries in the country would depend mainly on wood produced on farmlands, in irrigated plantations and imported timber. The natural forests will not be able to provide raw materials to the forest-based industries for a long time if the focus shifts to sustainable forest management (SFM) and major use of forests for forest services. However the NWFP-based industries are likely to expand.

Forests contribute fuelwood, which is the main source of household energy in Pakistan, in particular in the rural areas and urban areas not served with natural gas. Although the use of alternative fuels, e.g. natural gas, coal, off-grid hydropower, biogas and solar heaters is expected to increase, yet fuelwood would continue to be the main contributor as the domestic energy source.

The environmental services of forests include water and soil conservation, regulated water yield, protection from landslides, carbon sequestration, amelioration of climate, conservation of biodiversity and ecotourism. These have not received due attention and appreciation in Pakistan so far.

It is only recently that the importance of the environmental functions of forests has emerged. The Ministry of Environment (MOE) has decided to promote the concept and use it for compensating forest owner communities and individual right holders who have been denied income or rights of taking wood or selling trees to contractors for commercial logging due to the ban on felling of timber by the Government of Pakistan since 1992. This would be based on the benefits foregone, and the services and environmental benefits a forest would continue to render to the province and the nation.

Forests have been performing multiple social functions. The most prominent forest products extracted or activities conducted by local communities include timber, fuelwood, livestock grazing, medicinal, aromatic and other economic plants, honey, hunting of wild animal species, fishing etc. The forests provide subsistence to a very large number of poor people and communities and fulfil their spiritual and cultural needs. They have great potential for reducing poverty if used wisely.

Global warming and accelerated melting of snow in the northern and northwestern watersheds of Pakistan will have detrimental effects on the forests and forestry throughout Pakistan. The role of forests in provision of global public goods, in particular carbon sequestration for mitigation of global climate change and biodiversity conservation in Pakistan has received emphasis consequent upon signing of the UNFCCC and CBD.

There is great scope for Pakistan to enhance its contribution to the objectives of the UNFCCC and Kyoto Protocol by halting deforestation, reforestation and raising new plantations, especially in northern Pakistan. The global environment is currently very conducive to supporting forestry initiatives in the context of climate change.

The regional threat of acid rain affecting the forests of Pakistan may become a reality with heavy development of industries in neighbouring countries, if their production processes are not made cleaner. These industries could support Pakistan's requirements for timber, paper pulp and paper through enhanced flow of imports, although at much higher costs.

The relationship of forest departments with local communities had not been friendly in Pakistan in the past as elsewhere in developing countries. Communities have always been viewed as adversaries and forced to meet their demands for forest goods and services illegally, generally leading to overexploitation of forest resources. Briefly, the management of forests (both state-owned and communal) exclusively by public sector agencies has failed to control deforestation or degradation. As a result, community participation is being experimented with in forest management in Pakistan as an alternative option.

The role of forest departments in catalysing, supporting and coordinating the supply of alternatives for wood products to communities, in particular where exploitation has far exceeded the carrying capacities has been missing. The departments have also not tried to adjust the rights of individuals and communities in the wake of the rapid increase in the number of right holders due to increase in population. The user communities and individuals have failed to discharge their obligations and in realizing the limitations of the forest resources while exploiting beyond their carrying capacities.

A realization, although very late, for the need to involve communities in forest management, in particular with regard to North West Frontier Province has led to certain initiatives including joint forest management (JFM), and social mobilization and capacity building of communities in sustainably managing communal forests and other natural resources.

The mindset of the middle and lower level forest staff, lack of a programme approach vis à vis project approaches and lack of institutionalization of community participation approaches in policies and laws still remain barriers in making these models fully successful and replicable. It is important that this incomplete agenda is completed in North West Frontier Province and other provinces adopt this approach applying the lesson learned in North West Frontier Province.

Public-private-partnership too has a great potential in Pakistan but the local communities must remain as part of the equation to achieve the full benefits of SFM.

The study confirms the outlook for forestry in Pakistan to 2020 conceived by the IGF (MOE) at the start of this study, i.e. the natural forests will shrink to 3 million ha and wood demand will grow to 58 million m^3 (FAO, 2007). The MDG target of expanding forest cover from 5.01% to 6% by 2015 has been set by the Government of Pakistan. This would mean bringing 1 million ha of new lands under forest cover. The federal government has increased budgetary allocations substantially for achieving this target.

Wood for construction, commercial, industrial and domestic energy will be produced mainly from private plantations and farmlands. Public-private partnerships will receive encouragement for raising plantations, employing sustainable and value-added utilization of NWFPs, generating cost effective and enhanced supplies of alternatives for timber and fuelwood and other forest-related enterprises.

Imports will be encouraged to meet the demands for timber, pulp and paper, which cannot be met by the forest resources in the country due to the large gap in supply and demand.

Forestry Vision, 2030 will be developed, and forest biodiversity conservation as well as forest services will receive more emphasis.

Hopefully, the direction being provided by this paper will be taken forward for implementation in the current scenario of an improved investment environment in the public sector for forestry due to linkage of this sector with achievement of MDGs in Pakistan.

1. INTRODUCTION

Background

The first Pakistan Country Report regarding the Forestry Outlook was prepared by the Pakistan Forest Institute in 1997 as a contribution to Asia-Pacific Forestry Sector Outlook Study. Unfortunately, the utility of this paper did not go beyond an academic study due to lack of consultation with stakeholders in its development.

Amongst the earlier initiatives, the Forestry Sector Master Plan developed by the Government of Pakistan with the technical assistance of the Asian Development Bank was almost a similar exercise, which served the outlook purpose but its scope extended to master planning at the national and provincial levels. However, this master plan has not been implemented as progress could not be made in removing all major barriers and addressing constraints. This document is, however, quoted widely, especially as a benchmark data source.

Forests and forestry were also studied by the contemporary initiative of the MOE in the late 1980s to early 1990s, namely the National Conservation Strategy (NCS). The policy, legal, institutional and financial frameworks recommended by it had more acceptability by the implementing agencies and stakeholders on account of their meaningful participation in the development of the NCS.

Main purpose and aims of the Pakistan Forestry Sector Outlook Study are:

- Support policy review and reform
- Describe how forests in Pakistan might look in the future
- Develop a coherent and collective vision of the range of choices and options for action; and draw conclusions about the range of outcomes that might flow from these choices
- Help place Pakistan's policy objective in a regional and global context, to facilitate better national policies and planning
- Help steer the forestry sector along a path that is relevant and appropriate to emerging needs
- Seek to draw a broad picture of social, economic and technological changes to enable improved decision making for forests and forestry to confront a complex array of opportunities and challenges

The specific objectives of the Pakistan country study, apropos APFSOS, are:

- Identify emerging socio-economic changes impacting on forests and forestry
- Analyse probable scenarios for forestry developments to 2020
- Identify priorities and strategies to address emerging opportunities and changes

Scope and coverage of the paper

The paper covers all relevant aspects of forests and forestry in the Islamic Republic of Pakistan leading to Outlook 2020, aiming at identification of internal and external pressures; influences and social, economic and environmental changes; prioritization of issues; and the way forward, especially through changes in policy and strategic planning.

Key questions and issues addressed

Key issues and questions examined in the paper are:

- Unsustainable forest management
- Deforestation of natural forests
- Loss of biodiversity
- Lack of management of Protected Areas
- Lack of participation of key stakeholders in forest management including joint forest management (JFM) and public-private partnership in forestry for SFM
- Low forest density and apathy to regenerate and fully stock forests
- Forest ecosystem services not being recognized and valued
- Imbalance in sustainable supply and demand
- Exploiting the potential for forest landscape restoration (FLR)
- Alternatives for fuelwood, timber and other forest products whose demand exceeds sustainable supplies
- Reliable and cost effective imports of timber, paper pulp and paper

The process

Information was gathered, a comprehensive review of literature was undertaken, the evolution of key forestry issues was examined and important trends were indentified along with a range of outcomes, and implications for forestry, that may arise from actions taken today.

The outlook study was undertaken through a participatory approach involving key stakeholders including public sector agencies, representatives of forest-dependent communities, representatives from the private sector, in particular forest industries, academic and research institutions, civil society organizations, international environmental organizations, bilateral and multilateral development agencies as well as the media.

Meetings and focussed discussions were held with key stakeholders. Finally, a National Workshop was held in Islamabad on December 15, 2007. The information and feedback received in meetings and consultation workshops have been incorporated in this paper.

Structure of the report

Section 1 introduces the objectives, scope and coverage of the paper, key questions and issues addressed, the process adopted and structure of the report. In Section 2 discusses the current state of forests in Pakistan. An overall indication of the broad trends in recent decades is provided. The positive and negative tendencies, overall state of resources and how these are managed and exploited are also given. Forest goods and services are identified and their relative significance analysed. Policy and institutional frameworks are also included in this chapter and the key issues confronting the forest sector are given.

Section 3 discusses the key factors influencing the future state of forests and forestry and gives an overview of and key trends in demographic changes and other changing characteristics in society; the political and institutional environment; economic changes; the impact of globalization and regionalization; the impact of environmental issues and policies; technological changes and other key factors in the forest sector.

Probable scenarios and their implications in 2020 are given in Section 4. Future scenarios for forestry are discussed in Section 5, options for creating a better future are given in Section 6 and conclusions are reported in Section 7.

2. CURRENT STATE OF FORESTS IN PAKISTAN

Most of the country falls in arid and semi-arid zones. Agriculture and livestock grazing are the major land uses in Pakistan. Both of these land uses compete with and impact forests and forestry in many ways.

Pakistan has very low forest cover of 5.01% but its great variety reflects the country's great physiographic and climatic contrasts. Pakistan's forest and woodland types include: littoral and swamp forests; tropical dry deciduous forests; tropical thorn forests; sub-tropical broad-leaved evergreen forests; sub-tropical pine forests; Himalayan moist temperate forests; Himalayan dry temperate forests; sub-alpine forests; and alpine scrub. Coniferous forests predominate. Man-made plantations are an important wood source in Pakistan. These fall into four categories: irrigated plantations; farmland trees; linear planting; and miscellaneous planting.

The North West Frontier Province has around 42% of Pakistan's forests. More than 75% of which is found in arid and semi-arid areas as tropical thorn vegetation, mainly comprising bushes and small trees, while the rest is in sub-tropical and temperate zones in the foothills and high mountains respectively comprising predominantly coniferous forests with only 0.03 ha of forest per capita compared to the world average of 1 ha.

The distribution of forests and tree cover in the country is shown in Figure 1.

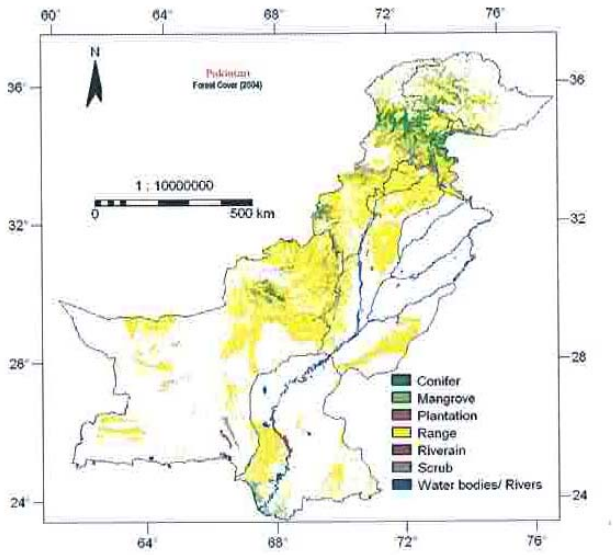


Figure 1. Distribution of forests in Pakistan, 2004

Province-wise distribution of total forest area and the area of various forests types, plantations and farm tree cover are shown in Figures 2 (FSMP 1992) and 3 (FSMP 1992).

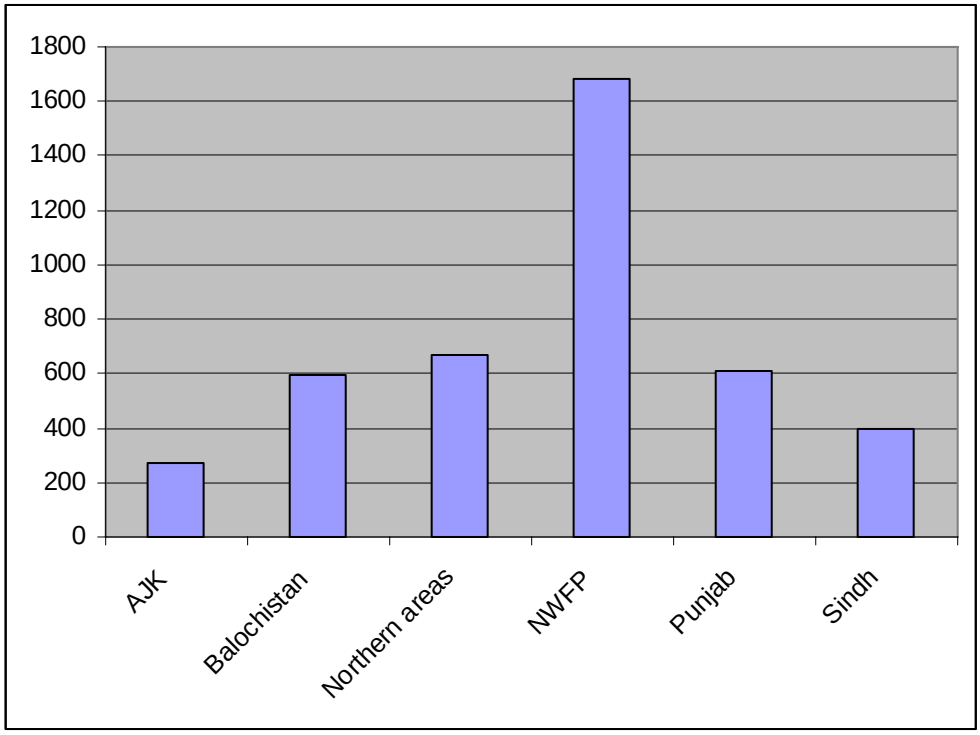


Figure 2. Province-wise forest area in Pakistan ('000 ha)

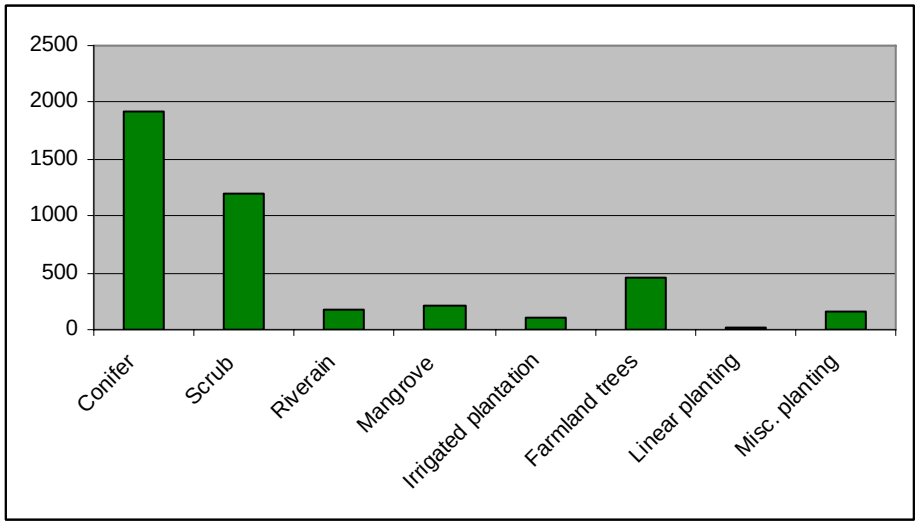


Figure 3. Area of forests/plantations/farm tree cover in Pakistan ('000 ha)

Administratively, 4.2 million ha of lands (or 4.8%) are allocated to natural forests, under the jurisdiction of provincial forest departments.

Trends in forest resources

Forest resources in Pakistan have been managed on scientific lines since the middle of the 19th century, with the prime objective of conservation, sustainable use and meeting the subsistence needs of local communities. Coniferous forests used to be traditionally managed under selection, group selection and shelter wood silvicultural systems. Scrub forests were not to be exploited commercially but protected (i.e watersheds and wildlife habitats) with sustainable wood extraction and grazing by the local communities. The silvicultural management system was selection with coppicing.

Riverine forests were managed under a clear felling system, especially as river erosion strips; seed sowing was generally done in the newly accrued but stabilized areas. Mangroves were managed as protected forests with some wood extraction and grazing allowed for local communities. Irrigated plantations were managed under the clear felling system.

Natural forests

In 1992, the total area of natural forests was 3.59 million ha (4.1% of the country's total area), which had shrunk in 2001 to 3.29 million ha (3.8%). This assessment includes only those contiguous forest areas which can be detected from satellite data. Very thin forests and isolated trees on natural landscapes were covered separately under field-based surveys and are reflected in farmland forests.

According to Landsat-based assessment of forest cover change, the annual rate of deforestation in natural forests was estimated at 27,000 ha, which is regarded as the official figure. However, other organizations report different figures as they use widely different definitions of forests and methodologies for monitoring of forests. For example, the NCS reported deforestation of 7,000 to 9,000 ha per annum resulting in annual decline of 0.2% forest cover in the 1980s. FAO reported deforestation of 39,000 ha per year in the 1990s in Pakistan.

Notwithstanding the authenticity of different data, the declining trend is obvious. Forest cover per capita is declining due to increase in human population as well as deforestation. However, at the same time the tree cover on farmlands has increased significantly.

Coniferous forests are located mainly in NWFP, AJK, Northern Areas (NAs), Balochistan and northern Punjab. Open and scattered stands of juniper and blue pine forests are found in Balochistan Province. Besides providing construction timber, their role in protecting land and soil on steep mountain slopes, supply of fuelwood and NWFPs, e.g. mushrooms, chilgoza nuts, medicinal plants, livestock grazing as well as forest services including wildlife habitat is well recognized. These forests covered an area of 1.913 million ha in 1992.

Forest working plans, which cover about 50% of forests, contain estimates of the volume of standing coniferous trees. The FSMP (1992) compiled data from 39 working plans for about 1.3 million ha with volume of about 185 million m^3 as shown in Table 1.

Table 1. Average volume of growing stock in coniferous forests in Pakistan (FSMP 1992)

Province/AJK/NAs	No. of plans/ schemes	Area '000 ha	Volume '000 m^3	Av. vol/ha m^3
AJK	4	423	71580	169
NAs	3	100	8977	90
NWFP	29	707	93537	132
Punjab	3	45	11090	246
Total	**39**	**1275**	**185184**	**145**

The volume per unit of area in descending order is Punjab, AJK, NWFP and NAs. Almost the entire area in the NAs falls in the dry temperate category.

Increment: The total annual growth of standing trees is estimated at 1.17 million m^3 against 0.8 million m^3 reported in 1992 registering a 46% increase in ten years.

Scrub forests comprise two vegetation types, dry sub-tropical broad-leaved forests and dry tropical thorn forests and covered an area of 1.191 million ha in 1992 in the foot-hills and lower slopes of the Himalayas, in the Salt, Kala-Chitta and Suleman Ranges and arid areas in

southwestern parts of the country. The scrub forests provide protective cover to the soils and are a source of water, fuelwood and fodder for local communities.

Riverine forests or "Bela" occur mainly in Punjab and Sindh provinces along the banks of the Indus River. They depend on river flooding during the monsoon season. These forests covered an area of 173,000 ha in 1992.

Mangroves are found on the Sindh and Balochistan coasts. The dry tropical mangroves in the Indus Delta form the sixth largest chunk in the world, covering an area of 205,000 ha in Sindh and 2,000 ha in Balochistan. These are subjected to heavy human pressure and ecological changes and are degraded. The greatest stress to the mangroves in the Indus Delta and Gawatar Bay is from abstraction and extraction of water through dams.

Irrigated plantations are found on 103,000 ha, mainly in the provinces of Punjab and Sindh. These depend on supply of irrigation water from the canal system and are worked on fixed rotation, mainly for timber and firewood.

Trees on farmlands: The limited forestry resource base in the country has been unable to meet the growing demands for timber, industrial wood and fuelwood. Agroforestry on farmlands was eminent because of the need and potential. Farmers in Pakistan have been growing trees on farm lands since supply of wood from natural forests and plantations became scarce, expensive or unavailable or they needed specific types of wood that did not grow naturally locally to meet their fuelwood and timber requirements.

The FSMP (1992) survey and analysis of data revealed 330 million standing trees with a volume of 70.292 million m^3 and density of 20.5 trees/ha on farmlands in the country. The area equivalent of trees works out at 466,000 ha at the rate of 710 trees/ha.

The 2004 Survey Report (FSMP 1992 and the Survey of Trees on Farmlands conducted by the office of the IGF (MoE)in 2004) showed an increase in all parameters of tree cover including a 3.86% increase in standing volume on farmlands in the country including AJK and Northern Areas in the ten years between the two studies. The area equivalent to block plantation has increased from 466,000 ha to 781,000 ha at the rate of 6.76% per annum; 3.37% of farmland area or 0.888% of the land area of Pakistan has trees. All provinces except Sindh have registered a positive trend in farm forestry. The results of both surveys are shown in Table 2 for comparison.

Table 2. Increase in growing stock of trees on farmlands (1992-2004) (FSMP, 1992)

Year	Total no. of trees (million)	Standing volume (million m^3)	Weighted average volume/ha (m^3)	Avg. no. of trees per ha
1992 *	331	70	3.63	20.5
2004	554	97	4.91	25
Avg. % per year enhancement between surveys (10 yrs)	6.37	3.86	3.52	2.20

Significant increase took place in the growing stock on farmlands i.e. from 3 million m^3 to 18 million m^3 in ten years in Balochistan where total farm area is 2.38 million ha. Linear and block plantations have also been established, mainly for shade and fuelwood, with expansion in the irrigation system for agriculture in the eastern districts of Balochistan during this period.

Status of forests

As a result of overexploitation, deforestation in natural forests is taking place at the rate of 0.75% per year (FAO, 2007). According to Landsat-based forest assessment, the mean annual rate of deforestation of natural forests is 27,000 ha.

However, annual average increase in the growing stock of farmland trees is 3.86%. The density of cover in the coniferous and mangrove forests is low as shown in Figure 4 (FSMP 1992).

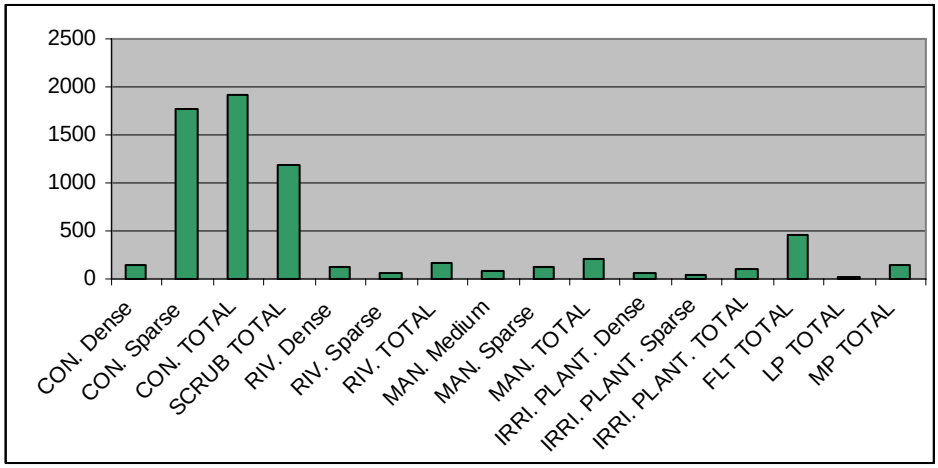


Figure 4. Density-wise forest area in Pakistan ('000 ha)
Note: CON. = coniferous; RIV. = riverine; MAN. = mangrove; IRRI. PLANT. = irrigated plantations.

Results of original time series/linear data analysis for forest types (1992-2001) are shown in Figure 5 (PFI, 2004).

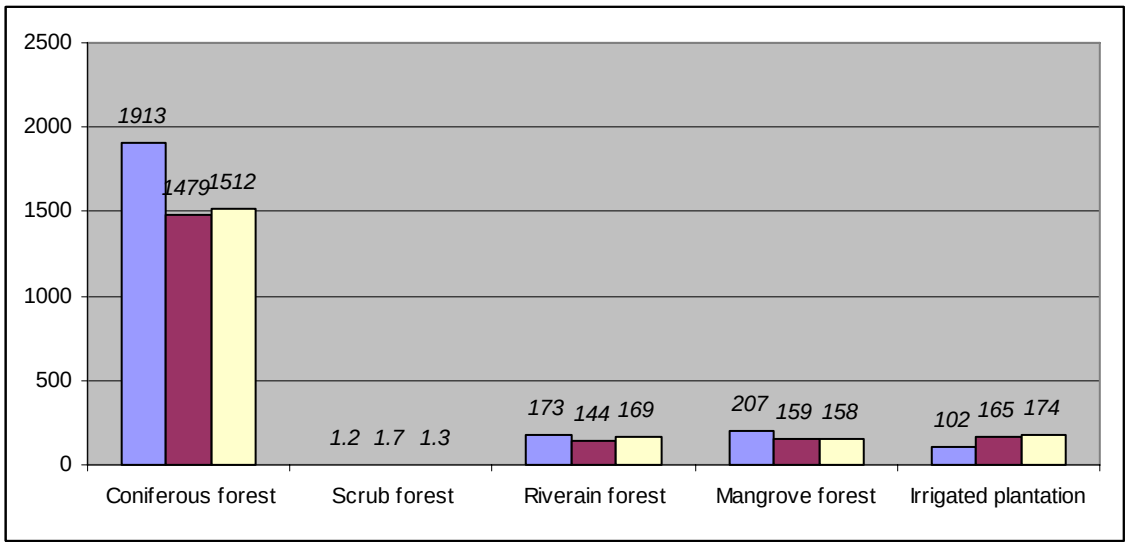


Figure 5. Results of original time series/linear data analysis for forest types (1992-2001) ('000 ha)

Rangelands of great diversity, from dry tropical in the south to alpine in the north of the country, were estimated in 1992, 1997 and 2001 at 28.507, 22.645 and 23.546 million ha respectively through original time series/linear data analysis as shown in Figure 6 (PFI, 2004).

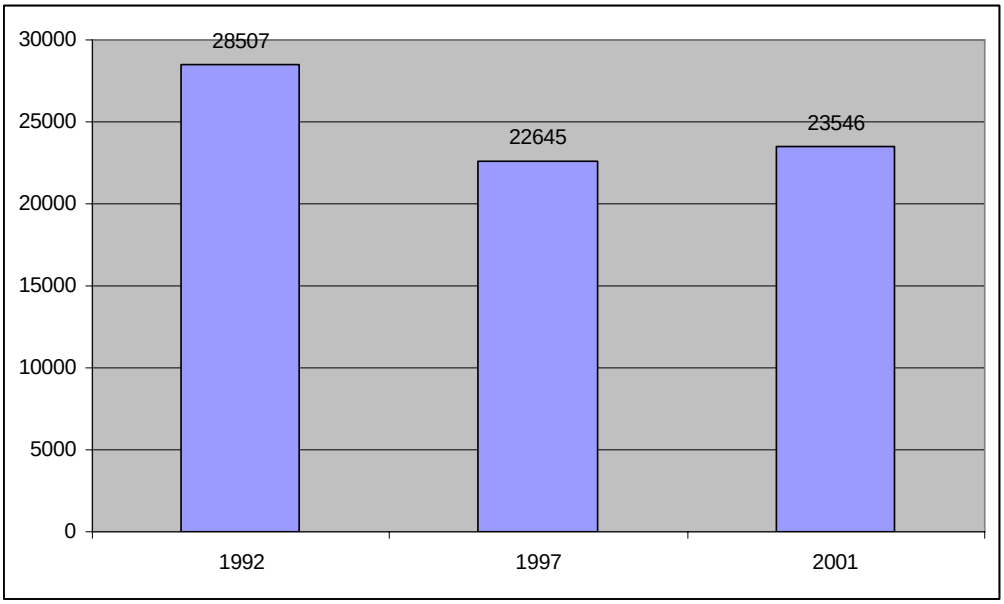


Figure 6. Results of original time series/linear data analysis for rangelands (1992-2001) ('000 ha)

Wood and wood products

According to Maanics Int. (2004) the total supply of wood in the country for 2002-2003 was 1.109 million m^3 comprising 0.470 million m^3 from local production (0.409 million m^3 of timber and 0.061 million m^3 of fuelwood) and 0.639 million m^3 of imported timber and wood products.

Supply of timber and fuelwood in Pakistan from state forests and imports is shown in Figure 7 (Maanics Intl., 2004).

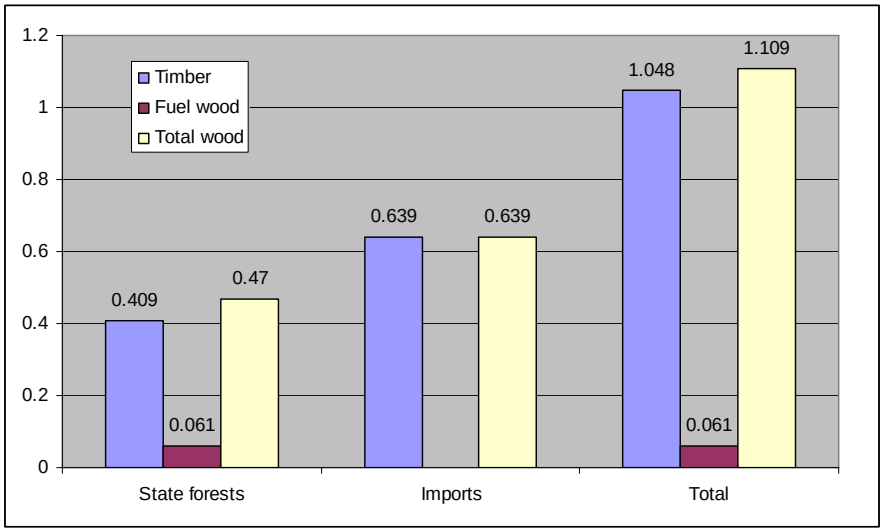


Figure 7. Supply of timber and fuelwood in Pakistan from state forests and imports (2002-2003)

The demand for forest products far exceeds the current level of sustainable domestic supplies. Total wood demand was 43.76 million m^3 in 2002-2003, out of which timber constituted 12.23 million m^3 and fuelwood 31.52 million m^3. The increase from 1992 to 2003 is based on annual growth of 2.1%. Sustainable supply (annual growth rate) is only 14.40 million m^3. Thus, there is a gap of 29.36 million m^3 in demand and supply as shown in Table 3, which is mainly being met mainly by overexploiting the forest resources and partly through import of paper products and timber.

The key challenge, however, is high demand of wood for fuel. Currently, the management approach focuses on extraction of resources with almost no management input and investment in production.

Annual wood consumption in the country in 2003 is shown separately for rural and urban areas and roundwood in Figure 8 (Maanics Intl., 2004).

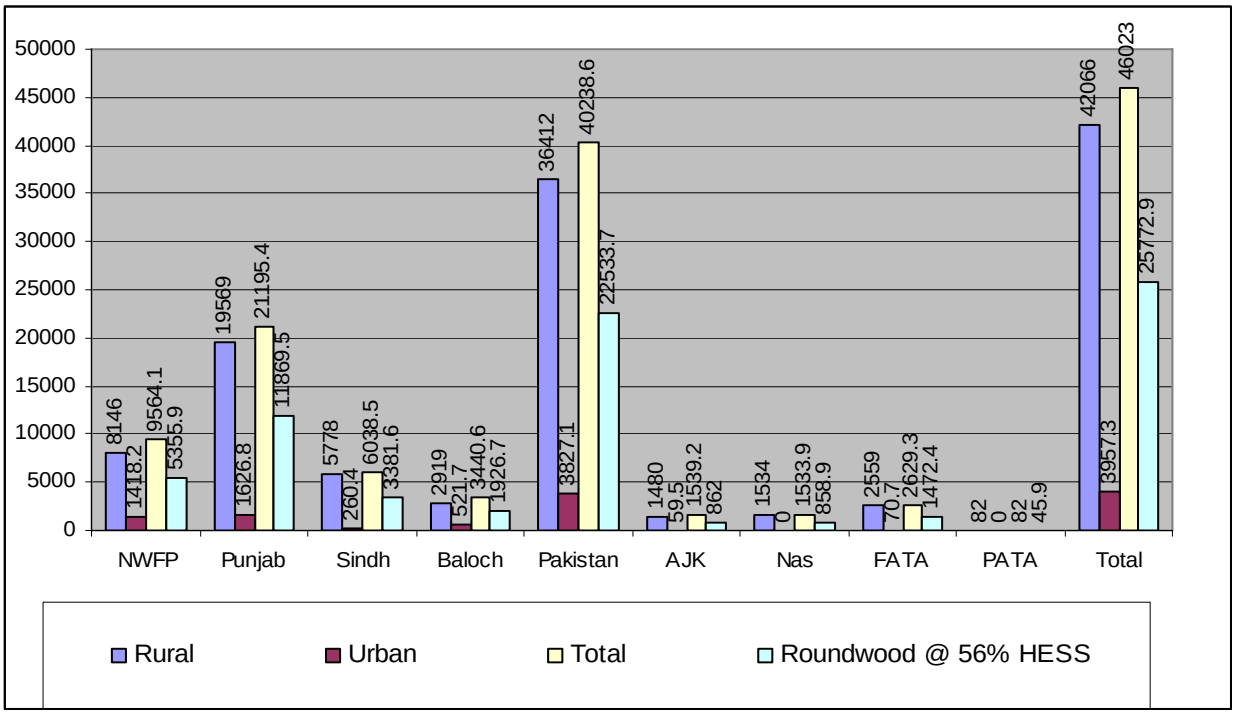


Figure 8. Annual consumption of fuelwood and roundwood (by volume) in Pakistan (2003) (volume '0' m^3)

Import and export: Exports have shown a rising trend from Rs3.5 billion in 1992-1993 to Rs21.314 billion in 2002-2003 with an average annual growth of 1.78%. Out of this, sports goods accounted for 92%, followed by furniture at 4.8%. The imports increased from Rs4.250 billion in 1992-1993 to Rs13.716 billion in 2002-2003 at an average annual increase of 0.95%. They accounted for 1.92% of the total imports of the country.

Table 3. Gap in supply and demand of wood in 2003

Items	NWFP	Punjab	Sindh	Baloch	AJK	NAs	Total
Wood consumption 2003	9.81	21.50	7.34	2.81	1.26	1.04	43.76
Wood production	4.39	6.36	1.68	0.54	0.69	0.74	14.40
Gap/wood shortage 2003	5.42	15.14	5.66	2.27	0.57	0.30	29.36

Industrial wood: Forest industries include construction, furniture, village carpentry, harvesting, industrial fuelwood, matches, particle board, sports goods, plywood, fibreboard, boats, crates and boxes, railway ties, paper, pulp, chip board and employ more than 500,000 workers. The survey estimated annual consumption of roundwood for the industrial sector at 12.238 million m^3 in 2003. The total consumption of wood-based rural industries was estimated 4.7 million m^3. However, over the years, increase in the supply of woody material from private farmlands has increased the number of small wood-based industries.

Wood as a source of energy

The share of wood energy in rural energy consumption is 37.52%. Relative shares of other sources of energy are illustrated in Figure 9 (FSMP, 1992).

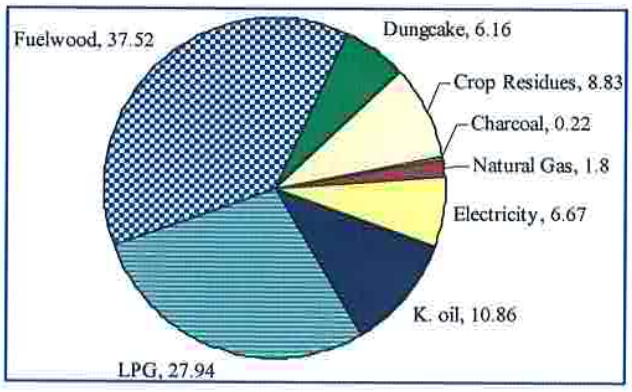


Figure 9. Share of fuelwood in total energy consumption, 1992

Annual consumption of fuelwood (weight and volume) in 2003 is shown in Figures 10 and 11.

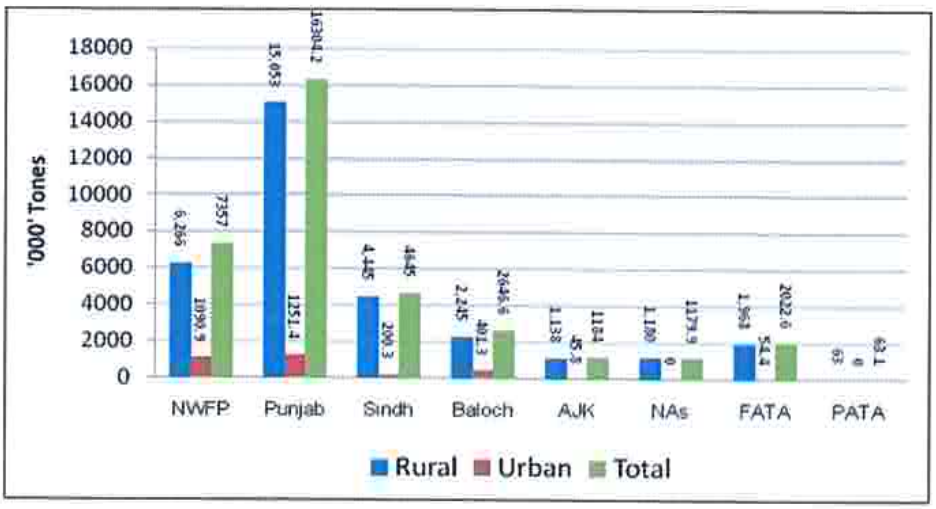


Figure 10. Annual consumption of fuelwood by weight in Pakistan (2003)

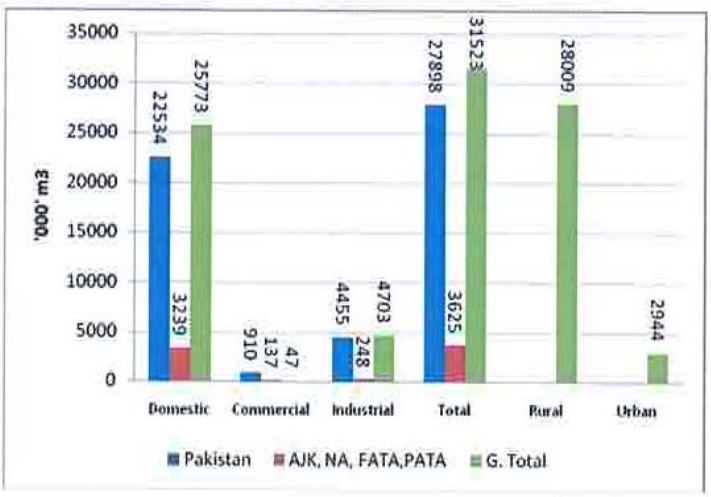


Figure 11. Annual consumption of fuelwood by volume in Pakistan (2003)

The consumption of fuelwood is higher in rural areas, and Punjab followed by NWFP and Sindh.

The consumption of fuelwood is more for domestic purpose, mostly in rural areas, followed by the industrial sector. The consumption of fuelwood was estimated at 26 million m^3 in 1992 and this increased to 31.52 million m^3 in 2003.

Firewood, dung and agricultural residues are the main cooking and heating fuels used by 90% of the rural and 60% of the urban households (FSMP, 1992). Thus, 32% of the total energy requirements in the country are met through biomass. Only 10% of people's firewood requirements are met by state forests and plantations. Mangroves provide fuelwood to about 12,000 people. The remaining 90% of the total requirement is met from farm trees. Fuelwood consumption per capita is highest in NAs, FATA and Balochistan in descending order.

The federal and provincial governments are endeavouring to increase forest area, forest productivity and promote tree planting on farmlands. MDG targets would bring 1 million ha of new lands under forest cover and this would certainly improve wood supplies.

Commercial sector: The commercial sector's use of fuelwood includes hotels, restaurants, tea shops, ovens, brick kilns, lime kilns, bakeries, milk and sweet shops etc. Fuelwood consumption in this sector was estimated at 1.047 million m^3.

Non-wood forest products

NWFPs constitute an important forest resource and include medicinal, aromatic and other economic plants, mushrooms, honey, wild fruits, resin, mazri, chilgoza nuts and a variety of other products. Unfortunately, they did not receive attention in earlier forest policies and management that focused mainly on production and sale of timber. There are ten leading dawakhana (small industries making herbal drugs) in Pakistan which are using about 20 million rupees worth of medicinal herbs per year presently. There are 50,000 registered Tabibs/Hakims, besides a greater number of unregistered practitioners. The rural people living in fragile ecosystems earn their livelihood or add to their income by collection and sale of medicinal herbs and other products. Forests and rangelands provide forage to about 90 million head of livestock.

It is estimated that about 28.80 million tonnes of shrimps and 2.441 million tonnes of fish are caught from mangroves in the Indus Delta. Mangroves provide forage to 8,000 camels, 5,000 buffaloes and more than 1,000 goats besides other forest products to 25,000 people in coastal communities.

The service functions of forests

The service functions of forests include:

- Regulation of water yield (sustained supply) and quality for irrigation and power generation, reduction of sedimentation in irrigation systems including water channels and reservoirs
- Production of oxygen
- CO_2 absorption (carbon sequestration)
- Increase in soil fertility – organic matter added to soils; micro-organisms in soil
- Absorption/intake of precipitation
- Production of useful algae, fungi, insects and other products
- Maintenance of life support systems and environmental balance
- Trapping of dust particles and other suspended pollutants
- Soil conservation and landslide control
- Resource for countryside recreation and ecotourism
- Biodiversity conservation

In addition to these values, forests ameliorate the severity of climate, increase precipitation and humidity, provide habitats for wildlife and space for recreation and ecotourism.

When forests are lost or severely degraded, their capacity for environmental regulatory functions is also lost, resulting in floods and soil erosion hazards, reduced soil fertility and loss of plant and animal life.

A study in Germany puts the value of the intangible benefits of a tree 8 times (US$3,200) that of the value of tangible products such as timber and firewood (US$400). However, the valuation of environmental benefits and services of forests and rangelands in monetary terms has not been empirically investigated and documented in Pakistan.

Of late, the environmental aspects of forests especially their functions as carbon sinks, homes to genetic biodiversity and their significant impact on global climate change have dominated the traditional perception of forests as sources of timber, firewood, fodder and NWFPs.

Water from watersheds: Ninety percent of water in Pakistan's rivers originates from northern mountainous watersheds. The most valuable function of forests and rangelands in Pakistan is sustained supply of sediment-free water for generation of environmentally friendly and cheap electricity, followed by water supply for agriculture. Water from the watersheds of the Indus River feeds 55,700 km of long canals in Pakistan.

Loss of vegetation cover in watersheds seriously impairs the hydrological cycle and results in landslides, and flash floods causing damage to infrastructure, settlements and even causing loss of human lives and livestock. The catastrophic floods of 1992 in northern Pakistan were attributed to large-scale deforestation in mountains that led to the imposition of a ban on commercial harvesting of forests by the Government of Pakistan.

Freshwater has also been supporting forests and agriculture in riverine areas, and mangroves in the Indus Delta respectively. The mangroves, in turn, provide most important but unquantifiable benefits, which include protection of the coast from wind and sea currents, protection of coastal villages against tidal action, cyclones and erosion. They support breeding of prawns and fishes and act as natural barrier against ecological and climatic disasters to safeguard the life, land and property of coastal people. Conservation of biodiversity, and recreation and ecotourism are the other benefits.

The agricultural and industrial economy of the country entirely depends on sustained supply of water from its reservoirs, rivers, and also on efficient working of the vast canal system. About 21% of the area of Pakistan, comprising mostly arid and semi-arid areas, is irrigated agriculture. When the water level recedes in reservoirs, insufficient electricity is generated to run the mills, tubewells and other machines due to frequent breakdown in power supply. Water yield is not properly regulated from areas devoid of vegetation.

Due to erosion and sedimentation the Mangla and Tarbela reservoirs are silting up at the rate of 48.47 million m^3 and 167.75 million m^3 per year respectively. Annual loss to the nation mainly due to deforestation and de-vegetation resulting in floods, erosion of fertile soils from upland watersheds and siltation of mega reservoirs is estimated at Rs2.3 billion.

The loss incurred due to reduced storage capacity of reservoirs, loss of fertile soils, enhanced maintenance cost of irrigation infrastructure, reduction in agricultural and industrial production, and higher cost of production of hydro power and storage per unit of water is high. Besides there are opportunity and social costs that could run into billion of rupees (SM Khan, 1984 and MIS, 1985)

As a result, watershed management in the mountains has emerged as a national priority with the construction of mega dams and reservoirs to generate hydropower and supply water to the massive irrigation system to support agriculture.

Urban forestry is practiced only in cities and big towns. The green areas in urban settlements provide recreation and perform the function of green lungs.

Forest biodiversity and protected areas: There is a remarkable diversity of forest habitats and tassociated biodiversity in Pakistan. About 400 (7.1%) of the species are endemic. The endangered mammals dependent on forest and rangeland habitats include the woolly flying squirrel, markhor (*Capra falconeri*), Urial (*Ovis orientalis*), goitred gazelle (*Gazella subgutturosa*), Marco Polo sheep (*Ovis ammon polii*), snow leopard, brown bear and the Balochistan black bear. Mangrove and riverine forests are endangered ecosystems in Pakistan. The three categories of Protected Areas (PAs), i.e. national parks, wildlife sanctuaries and game reserves established in Pakistan through provincial laws include many forests, sometimes with multiple legal designations e.g. a Reserved Forest under Pakistan Forest Act, 1927 and a National Park under a provincial wildlife law.

Policy and institutional framework

Policy framework: In the past, forest policy has been a part of the National Agriculture Policy. The Draft National Forest Policy (2004) is a separate document, covers forest, watershed, rangeland and wildlife, and is awaiting approval of the federal cabinet. It was formulated by the MOE through a multi-stakeholder consultative process. This policy seeks to launch a process for eliminating the fundamental causes of the depletion of renewable natural resources (RNR) through the participation of all agencies and stakeholders, to enable conservation, development and sustainable use of RNR. The policy encourages non-timber uses of forests in line with sustainable forest management principles.

The guiding principles of the Pakistan Forest Policy are:

- Forests and rangelands together with the biodiversity that inhabit these ecosystems are part of the ecology and economy of Pakistan, and an important national heritage that we need to conserve for present and future generations
- Sustainable management of the natural resources through active partnership with communities and various stakeholders for goods and services to support livelihood systems of communities
- Revenue generation shall not be the principal motive for forest management
- Ecosystems and habitats that are unique in their biodiversity and face threats for their extinction need to be conserved through a well-managed protected area system and legislation
- Alleviation of poverty in fragile ecosystems and watersheds through small income generating schemes like cultivation of medicinal plants and NWFPs
- Promotion of and support to NGOs to educate the public and create public awareness for environmental improvement
- Strengthening existing institutions in Natural Resource Management (NRM), particularly in participatory NRM, and encouraging private sector participation in forestry through establishment of multi-stakeholder forums at various levels
- Regular monitoring of the health and condition of forest and grassland ecosystems
- Management of RNR with their associated biodiversity in accordance with international standards and local requirements as well multilateral conservation conventions and treaties

The Draft Forest Policy is a good achievement but the Forest Act, 1927 is almost 80 years old. The NWFP Forest Department pioneered to have a new provincial forest policy and provincial forest law enacted in 2001. Balochistan Forest Department is currently formulating its new Forest Act and Biodiversity Act. Other provinces are expected to follow suit. Wildlife has always been treated with forests in policy documents.

Other sectoral policies and plans that have most impact and links pertinent to conservation and sustainable use of biodiversity are those relating to fisheries and agriculture and/or the Wildlife Management Boards, wherever they exist.

Current wildlife policies and plans tend to place heavy emphasis on fauna to the relegation of flora, and on game animals as opposed to all wild animal species. They relate almost exclusively to the establishment of protected areas, and hunting and trade controls for the listed species. The draft policy is more comprehensive.

Other sectoral policies dealing with biological resources tend not to address biodiversity or at the most marginally. Integration in sectoral policies is also lacking.

People's participation in, and decentralization and devolution of forest management

Implementation of many social forestry projects during the last decade with focus on integrated resource management in private, communal and state forests in Pakistan and involving community participation, have led to many lessons for policy and legal reform.

These projects have generated interest in alternate approaches to the existing forest management based on command and control. All policy and planning documents now identify social and participatory forestry as a workable approach to achieve SFM.

Participatory projects have in many ways impacted the functioning and performance of forestry institutions. They have helped to establish new ways of working that integrate forestry into needs of the local people and their livelihoods. An institutional change at the local level has been most notable in the development of participatory village organizations of various types. These village organizations have undertaken certain roles at the local level that were missing before in these projects. In many areas, community rules and code of conduct on resource protection, sharing and management of common assets have been developed by these institutions. New ways of working with local people have emerged and staff skills in participatory planning have resulted in the creation of new functional units within the Forest Departments.

Institutional framework: The importance of the forestry sector, in terms of economic and environmental services has started to receive attention at the political level. The fixing of the MDG target of increasing forest cover up to 6% by 2015 is supported by the allocation of MTDF (2005-2010) grants; approval of mega forestry programmes is a positive sign in this direction.

However, provincial resources are limited for forestry due to competing demands from development sectors like agriculture, water and sanitation, health and education.

Forestry is a provincial subject under the Constitution of Pakistan. Policy formulation has continued to be the subject of the federal government. The provincial, AJK and NA forest departments are responsible for planning, management, protection and development of natural forests and irrigated plantations with financial resources allocated by their governments, mainly through development programmes.

The forestry wing of the MOE is responsible for national policy and planning of the forestry sector, inter-ministerial, inter-sector and inter-provincial coordination, financing of forest sector programmes, meeting international obligations, forestry education and research, and monitoring and evaluation. These functions have important implications on the future of the forestry sector in Pakistan.

The capacity of the Ministry for carrying out the above functions has improved only slightly in the recent past. The National Forest Policy has been prepared, long-term strategies are under preparation, interaction and coordination with all stakeholders have improved, and mega projects for the forestry sector are being financed.

There is significant realization that future policies and programmes of the forestry sector should incorporate inter-sectoral concerns and also develop links with other sectors, and their programmes and projects to minimize their adverse impacts and to incorporate forestry-related activities in them.

The Pakistan Forest Institute (PFI) has been providing training and education in various forestry disciplines to foresters to meet the needs of federal institutions, provincial forestry departments, the private sector and civil society organizations.

Provincial forest departments: These have been focusing on protection through law enforcement. They have not adopted modern technologies such as water use efficiency, sustainable forest use and other aspects of forest management. They also lack capacities to cope with new challenges such as integration of biodiversity conservation, protected area management, and carbon fixing and trading mechanism in their mandates. They have severe limitations in effective law enforcement in the wake of lack of human resources, mobility, authority as well as interference by influential people.

The forest departments' functions are mainly limited to the state-owned forests and rangelands. They are neither mandated nor have the capacity for supporting forestry or range management outside the state-owned forests and communal forests (Guzara Forests in NWFP and Punjab and Private Forests in Northern Areas) being managed by them even for providing technical services.

Communities and civil society organizations: Participation of communities in planning and management of forests is uncommon. Although many participatory projects have been implemented in forested watersheds in mountainous areas of Pakistan, yet the community organizations established by projects, for joint actions, have generally not matured. The project-based models of social mobilization generally do not last after completion of projects.

The major drawbacks of short-term development projects have been the absence of adequate incentives and no legal cover for the participatory mechanism. An independent evaluation revealed that participatory forest management can work effectively in Pakistan with provision of sufficient economic incentives to the partner communities such as benefit sharing with stakeholders.

During the last 15 years, many non-profit, civil society organizations have established and are working for forest conservation and development. The Government of Pakistan, as its general policy, is encouraging civil society organizations to act as a bridge between government functionaries and communities.

Some NGOs have shown excellent performance, in particular in creating mass awareness, informal forestry education, raising community nurseries, tree planting, and protection of forests from fires and theft. Governments provide small grants to selected NGO forestry projects.

National NGOs, e.g. the National Rural Support Programme (NRSP), Sungi Development Foundation, and international organizations like IUCN, WWF, and SUSG-Central Asia have been partners with the government in several projects concerning forestry, wildlife and biodiversity. Since most of the NGOs and international organizations depend on grant funds from international donors for forest activities, the future prospects of their role depends on donor interest in investing in the forestry sector.

Forest users and protection associations: Responding to forest damage, in particular in communal forests, a number of volunteer forest protection organizations have been formed and are operational. In different ecoregions and forest types, their roles and responsibilities differ widely, depending on the need (e.g. forest fires, theft and illegal logging). This is a welcome change but needs the cooperation of local forest staff for effectiveness.

Unfortunately, a working relationship could not be developed with forest departments, and as such there exists a state of mutual mistrust and disharmony. These associations are rarely integrated in decision making and planning for forest protection and development. Some forest users' associations have remained weak and ineffective due to lack of cooperation from the relevant forest departments.

Although the rhetoric of participatory planning and management is heard from the federal and provincial forest agencies yet serious efforts have not been made by them to practice it in true sense and spirit. This is currently limited to the participation of stakeholders in workshops and meetings. There is little likelihood of substantial improvement in functional relations between forest departments, local communities, the private sector and NGOs in the near future. However, the long-term scenario is expected to be positive.

Key issues and an overview of the overall state of forests and forestry

Most parts of the country with the exception of a small wet temperate zone in NWFP and AJK are arid and semi-arid, and can support mainly thorny scrub vegetation. Growing plantations, as commercial entities, without irrigation is not viable. It is technically difficult, if not impossible. Growth of trees is slow and incidence of livestock grazing is high.

Deforestation and degradation of natural forests, retrogression, fragmentation and loss of wildlife habitats as well as decline in populations of forest-dependent species continues unabatedly due to many direct and underlying causes. While tree density in natural forests is declining, forest area is not decreasing and tree cover on farmlands is increasing. Forest cover per capita is declining not only due to increase in human population but also because of deforestation. The major direct causes include:

1. Overexploitation of forests for fuelwood, timber, grazing of livestock and NWFPs due to imbalance in the demand and the production capacity of forests as well as without investing in and ensuring regeneration.
2. Conversion of forests (even on steep hill slopes) into agricultural lands: unplanned developments, especially for housing and communication infrastructure

The main underlying causes include:

1. Rapid increase in population and change in lifestyles
2. Poverty of rural communities due to lack of sustainable livelihoods and their high dependence on forests not only for meeting subsistence needs for wood products but also for income generation
3. Lack of alternate means of energy, especially for rural households
4. Weak capacities of the public sector agencies and the local communities to manage their forests sustainably

5. Lack of advanced technology to manage and regenerate the forests sustainably
6. Lack of recognition of environmental services including regulation of yield of water, biodiversity conservation, carbon fixing and amelioration of climate, countryside recreation and ecotourism and control of soil erosion
7. Lack of involvement of stakeholders in forest management and open and transparent benefit sharing

Sustainable forest management is not practiced in its complete form and true sense as its parameters are not yet understood by the forest managers.

Forestry resources have been overexploited throughout Pakistan without ensuring regeneration. The threats to forests, rangelands and biodiversity include expanding settlements, drainage schemes, increasing salinity and water-logging of soils due to extensive surface irrigation, the construction of dams and barrages, energy-generating development, logging and other forms of deforestation, expanding agriculture and livestock grazing with associated overgrazing and soil erosion, pollution by fertilizers, pesticides and industrial pollutants, increasing pressure on biodiversity from alien species, hunting, transportation, and other activities.

However conversion of forest land to agriculture, settlements, mining and communication infrastructure on a large scale has been the major threat. Large tracts of tropical thorn scrub and riverine forests in the Indus plains have disappeared due to the pressures stemming from irrigated agriculture. Economic policies have also widened income disparities and forced people to exploit biodiversity at rates that are no longer sustainable.

The key issues are:

Population: The total population has increased four-fold since the creation of Pakistan in 1947. With only 5.01% forest cover, multiplication of population and consequent pressure has already depleted the forests to critical limits. The population of Pakistan according to the 1998 census was estimated at 130.6 million (rural 67%, urban 33%). The population is growing at 2.6% annually and is currently estimated at 169 million. The remaining meagre forest resources are not sufficient to meet the requirements for wood and NWFPs on a sustainable basis even for the current level of human population.

Traditional dependence on forests: Pakistan's economy is agro-based and about two-thirds of the population resides in rural areas. Although there is a wide spectrum of social and cultural setups in different ecozones – mountains, plateaus, plains, deserts and coastal areas, yet the common characteristics are the traditional dependence of rural communities on natural vegetation. Rural dwellers located close to natural forest, legal owners, legitimate right holders or non-right holders, all enjoy multiple uses of forests.

They depend, to a varying degree, upon forests for construction wood, fuelwood, grazing and many other uses. Medicinal and aromatic plants and other NWFPs are used by about 80% of forest dwellers, in one way or the other. Communities living away from forests rely on purchase of forest products like fuelwood, wild fruits and medicinal plants from markets. In the plains, there is similar dependence on irrigated plantations.

The direct dependence of the rural masses on forests for subsistence is declining gradually and is expected to further decline significantly by 2020 with economic development and alternate sustainable livelihoods as well as via the increasing use of wood alternatives.

Wood alternatives: Regular and cost effective supply of wood alternatives is an issue, although middle and upper classes of forest-dependent people including owners and right

holders are adopting wood alternatives, e.g. agricultural residues, thinning material from orchards, LPG, sawdust etc.

Water: Abstraction and extraction of river waters has continued with the construction of dams and barrages. The extent and intensity of flooding has decreased and the riverine forests and mangroves are declining rapidly (PFI, 2004). The competing uses of water mainly for agriculture and power have disturbed the supply of water to the plantations. Ironically, whatsoever quantity of water becomes available is not used efficiently due to prevailing primitive and inefficient practices.

Competing uses and developments: Many stresses on forests and watersheds are associated, directly or indirectly, with human activities in other areas such as agriculture, mining, stone and marble quarrying, tourism infrastructure and communication networks and housing and settlements. These land uses and developments have adversely impacted forests' protective, productive and environmental stability functions.

Weak law enforcement: The enforcement of law related to forest and wildlife protection and offences through various legal instruments like the Pakistan Forest Act 1927, Hazara Forest Act 1936, provincial wildlife acts/ordinances and related acts has been ineffective and very weak. Forest departments have been unable to cope with the growing forest encroachments, theft and illegal logging cases in civil courts.

Forest fires: Forest fires are quite frequent in Pakistan. A survey conducted by PFI in 2000 revealed that an area of 49,986 ha, i.e. 1.27% out of 3.950 million ha, surveyed is affected annually by forest fires. They cause damage to forest trees, regeneration and undergrowth as well as associated fauna and other elements.

Low priority of the forest sector: Forests, rangelands, wildlife, biodiversity and environment do not have the desired national priority in Pakistan. As a result, these resources do not get enough attention and resources for their sustainable management.

Forestry in Pakistan is a provincial subject. Provincial forest departments formulate annual plans for which financial allocations are made by the provincial governments depending upon the size of the Public Sector Development Programme. Due to financial constraints, development programmes and investments in forestry remain low. The forestry sector is not organized and prepared to implement large-scale investment projects to be financed through loans.

Conflicts: Negative political interference in favour of illegal forest harvesting, encroachments and transfer of state forest lands has also been seen in the past. Conflicts exist between forestry and development sectors including agriculture, housing and settlements, mining, tourism, communication and defence in particular on transfer of forest lands for non-forestry purposes. Conflicts between forest departments and local communities have been aggravated over time, in particular where people encroach upon forest lands.

Increase in housing: During the recent past, important changes have taken place in the attitudes, behaviours, lifestyles and actions of rural societies towards forests, particularly in lowlands and irrigated tracts of Pakistan. The joint family system, both in urban and rural settings, will continue to disintegrate into smaller units. Hence the need for independent houses will increase considerably. Consequently, the demand for construction timber and wood products will increase.

Land tenure: Land tenure systems in Pakistan are very complex especially in the mountainous areas where natural forests are located. Many tribal communities have settled in

these areas since centuries ago; ownership rights are not well-defined and documented in government records.

Uncertain tenure and propriety rights prevent tenants, landless and nomadic grazing communities from protecting and conserving forest and land resources, which do not belong to them. Thus, in many areas where settlement of land rights has not yet taken place due to complex tribal systems, the forests are communal or joint properties allowing open access to all share holders.

Natural forests in northern Pakistan are, generally, owned de-facto by tribes or village communities and de jure in Chilas District in Northern Areas. People lack interest in managing communal properties. There are conflicts among right holders on responsibilities and benefits. Inter-caste and inter-tribe conflicts over land and forests are common, which are not conducive to SFM. Mistrust and rivalries within tribes/families and communities also lead to forest fires and thefts.

The consequences of tenure arrangements that do not provide incentives to the tenant for use of such resources, have not only been degradation per se but also adverse impacts on prime watershed functions in the hilly areas where watershed values are more important than direct monetary benefits.

There is no possibility of improvement in the land tenure system; this issue is very thorny with political ramifications. The federal government's bans on commercial timber harvesting since 1992 will be reviewed to establish a sound system, which ensures only sustainable harvesting and wherein successful regeneration is ensured.

Lack of community participation: The land tenure studies suggest that enabling policies and legislation that facilitate community participation and enhance community ownership would be necessary to rehabilitate degraded forests and rangelands. The participation will improve with replication and scaling up of successful approaches of community participation.

Conflicts with local communities: Externally, the owner tribes/families or communities have conflicts with forest departments on various management issues and benefit sharing. The government's ban on timber harvesting since 1992 has given rise to major conflict between the forest owner tribes/families/communities and the government.

Inefficient use: There is much wastage of timber due to inefficient felling, conversion and transport practices as well as in making the end product. Similarly, the use of fuelwood is generally inefficient. Improvements in technologies, made in the recent past, are in demonstration or application stages and will be able to reduce wastage.

3. KEY FACTORS INFLUENCING THE FUTURE STATE OF FORESTS AND FORESTRY IN PAKISTAN

An overview of the changing characteristics of society

The changing characteristics of the society in Pakistan include the following:

- High human population growth and migration of people from rural areas to urban centres
- Reduction in annual population growth rate
- Growing use of wood alternatives
- Reduction in poverty from the 30s to 20s in percent terms
- Increase in mobility for employment, work, trade
- Easy transport of wood and wood products, even from long distances
- Reduced disparity in availability of merchandise and services and their prices at the various markets and consumption centres in the country
- Reduced nomadic grazing
- Growing energy crises
- High prices of wood and wood products
- Improvement in rate of literacy and education and awareness levels
- Flood of information due to vibrant media, especially in the urban and semi-urban areas
- Lack of proactive readiness for payment of user charges for community services
- Preference to pursue individual's interest as against common national interest as well as short-term benefits against long-term sustainable gains

Some of these characteristics are common for other groups, e.g. demographic and economic changes. The majority of these characteristics are positive in the context of sustainability of forests but some are not so favourable in this regard.

Demographic changes

Population growth: The population is expected to reach 220 to 222 million in 2020 at a constant fertility rate of 1.98. Population density, on average, is likely to rise from the existing 200 to 257 persons/km^2 by 2020 (tabular data source: Population Division of the UN Department of Economic and Social Affairs). The National Population Vision, 2030 predicts that Pakistan will rank five globally by 2030, with a population ranging between 230 and 260 million people, 60% of whom will live in urban areas. The trend and projected population growth is shown in Figures 12 and 13 respectively.

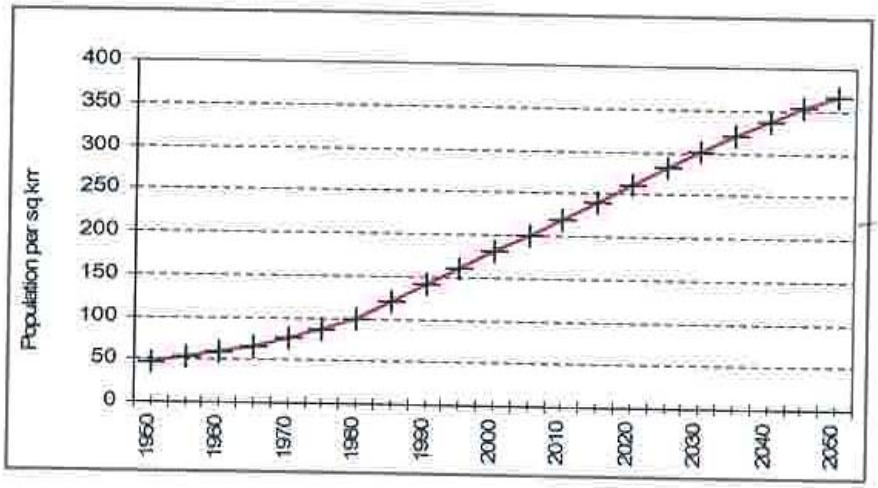


Figure 12. Projected population growth (2003-2018)

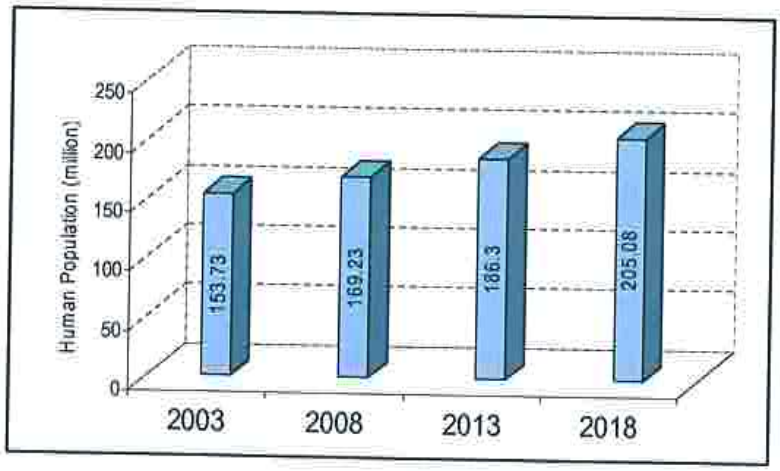


Figure 13. Trend in population density (1950-2050)

Further addition of 60 million people by 2020 will certainly put further pressure on forest resources. However, the trend of population migrating to urban areas will certainly have positive impacts on forests, as their dependence on forest resources as urbanites will be significantly less than as rural households.

There is no balance between supply and demand due to population growth and an incompatible forest resource base. Supply has only steadily increased from farm trees whereas pressure on natural forests has continued to increase significantly.

The political and institutional environment

The public sector agencies, in particular the provincial forest departments and the local communities will continue to be the main players. The federal agencies are likely to be more active and supportive in the future due to obligatory achievement of the MDG target of increasing 1% forest cover by 2015. Civil society organizations and donors are expected to provide more support, especially in the context of the role of forests in mitigating climate change.

The MOE and the provincial forest departments are likely to promote and adopt the SFM approach respectively; create an enabling environment and support for communities, farmers and other stakeholders to play their potential role in forestry; strengthen monitoring and

evaluation of projects, promote environment assessment of developments; encourage public-private partnership; lay emphasis on forest services, and promote wood alternatives as well as alternative sustainable livelihoods.

Communities and civil society organizations are likely to contribute to SFM through sustainable use of forest resources, farm forestry, and use of natural forests mainly for forest services.

The following will influence the forestry sector positively:

- Implementation of MEAs i.e. the CBD, UNCCD, UNFCCC and UNFF Non-Legal Binding Instrument
- Development of carbon sinks on state and private lands by using the CDM
- Integrating forestry with the programmes and projects of other sectors, e.g. development of dams, canals, highways, tourism, agriculture, livestock etc.
- Meeting of MDG commitments by providing higher allocations: US$800 million equivalent already committed for 2005-2010
- Legal and institutional (forest service) reforms to adopt and monitor SFM

Political will in favour of forests and forestry is likely to improve in the future. The performance of the MOE, in particular in coordination and monitoring, as well as timely completion of projects with achievement of objectives is likely to improve. Cross-sectoral considerations and interagency links are likely to improve if the MOE succeeds in establishing and effectively managing a mechanism for strengthening inter-ministerial and inter-sectoral linkages. The coordination will further improve in the future with all other stakeholders including the private sector. These improvements will have a positive impact on the conservation and development of forest resources.

The provincial forest departments are expected to undergo institutional reforms including re-visiting their mandate and management approaches. The structure, functions and performance of provincial forest departments are likely to change substantially with the expected financial and technical support of federal government. In particular, their outreach to farmlands for agro-forestry would expand reasonably well.

The capacities of provincial forest departments and other stakeholders are most likely to improve and the new technologies would be accessed and adopted at least on an experimental basis. However, nationwide programmes would be required for strengthening of forest departments and competency development of their staff.

This is critical for retaining relevance, usefulness and effectiveness. This would help them to support forestry or range management outside the state-owned forests, watersheds and rangelands. Generally, the situation will improve and development of forests on communal and private lands and tree plantation on farmlands will be boosted.

Participation of communities in planning and management of forests will improve. Benefiting from the lessons learnt in many donor-funded projects, the best practices, including JFM, with economic incentives to the partner communities and other stakeholders will be replicated and successful initiatives scaled up. The role of civil society organizations will increase with the enabling environment being created by the government for them. There is likelihood of some improvement in functional relations between forest departments, local communities, the private sector and NGOs in the long term.

However, public-private partnership will improve less in the forestry sector, compared with other sectors, despite the shift in the government's policy coupled with an enabling

environment being created to promote public-private partnership. This is mainly due to lack of understanding regarding the possibilities, parameters and mechanisms, and low innovative thinking and entrepreneurship in the forest departments on the one hand and negative experiences of working with the informal private sector in the past.

Conflicts between forestry and development sectors including agriculture, housing and settlements, mining, tourism, communications and defence in particular on transfer of forest lands for non-forestry purposes as well as conflicts between forest departments and local communities are likely to continue in the future. An effective mechanism that protects against change in forest land use is unlikely. The middle and lower category forest staff are less likely to change their mindset in favour of forest users and protection associations without constant advice and counselling by senior forest staff and reporting in the annual performance documents.

Economic changes

Major economic changes may happen due to the developing but fragile economy of the country. Some important trends and changes are summarized in the following paragraphs.

In future, Pakistan's macroeconomic framework is expected to consider the global economic scenario as well. The government is also set to reduce poverty significantly by 2015 as an MDG target and eliminate extreme poverty before 2030. Keeping in view these prerequisites GDP growth rate of 7% is predicted in the pre-2020 period.

Agriculture, including livestock, contributes about 26% in GDP. Rangelands are key in the contribution currently being attributed exclusively to the livestock sector.

The forest sector's share in national GDP is fractional as shown in Figure 14 (GOP, 2007).

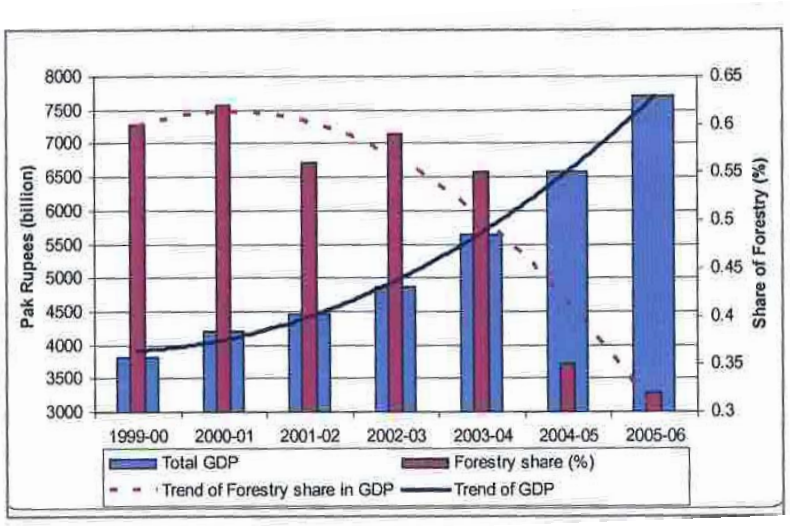


Figure 14. Share of forestry in GDP of Pakistan (1999-2000 to 2005-2006)

Rather the contribution of the forestry sector in GDP has been decreasing. These figures are, however, not representative of the true contribution of the forestry sector in the national economy since many forest goods and almost all forest services e.g. water, agriculture, tourism, carbon sequestration, soil conservation, biodiversity etc. remain unaccounted for. Instead, only the products from state-managed forests, which are marketed, are accounted for.

About 95% of timber and 99% of fuelwood demands are met by farmlands. The forest products of farmlands are either used at the farm level or sold in the local market. There is no

mechanism to value these products for GDP calculations. It is estimated that by including farmland products, the forestry share in the GDP would have been 1.58% in 2001-2002 instead of 0.56%.

If the ban on commercial harvesting continues and long-term forest management plans, that include timber logging, are not developed and implemented, the share of the forestry sector in the GDP is likely to keep on declining. However, the revenues from carbon credits under the CDM and ecotourism would increase in that case. If serious efforts are made to explore and utilize non-conventional NWFPs, in particular medicinal, aromatic and other economic plants, the share of the forest sector would increase in the GDP in the coming decades.

Imports: It is anticipated that imports of construction wood would meet the additional demand.

Agriculture-forestry interface issues: The agriculture sector is the closest ally as well as rival of the forest sector in many respects including agro-forestry. Farm forestry has seen a rising trend. However, agriculture competes with the forest sector for irrigation water since agricultural crops and orchards are treated as more important than forest trees and plantations, which also need higher volumes of water. Efficient irrigation systems are not practiced in the irrigated forest plantations.

A negative forestry-agriculture interface is seen in clearing of natural forests in mountainous areas for terraced agriculture. However, this trend is declining due to low productivity and profitability of agriculture on steep hillsides and is expected to continue in the future as well.

Economic development: The mega developmental initiatives by public and corporate sectors e.g. New Murree City in Patriata Reserved Forest, island development at Bundal/Buddu among mangroves, Sandspit-Hawksbay Beach Front developments in mangroves/marine turtle nesting beaches and communication infrastructure through protected areas are taking a toll on forests. In many cases, even environmental impact assessment (EIA) as the mandatory requirement under the Pakistan Environmental Protection Act, 1997 is not conducted or the stakeholders are not consulted.

Employment in the forest sector: The World Bank has estimated that in Pakistan 100,000 people are involved in the wood fuel trade; 73% is permanently employed and the remaining 27% temporarily employed. The business generates about Rs.11.3 billion annually, which is equivalent to 10% of the country's exports. In the near future, with increasing wages and diverting more labour force to other sectors, working in forests for planting, protection and harvesting is likely to be costlier. At the national level, direct employment in forest operations is likely to diminish in future, which will be de-motivating for forest conservation.

Rural development: Past developments in education, communication and technological fields have collectively brought visible changes in the quality of life of the rural masses. Provision of and switching to clean fuels is impacting positively on the conservation of forests. This trend of switching to LPG and natural gas for meeting domestic energy demands will continue in the domestic, commercial and industrial sectors.

Another change in the housing and living of rural communities in forested areas in mountains and plains, is in the use of alternative construction material.

Burning wood and switching to alternatives: Presently, 72% of all wood used in Pakistan is consumed as fuelwood, mainly in the domestic sector (81.8%), commercial sectors such as restaurants, bakeries (3.3%), and industries (14.9%) e.g. a tobacco curing, brick kilns etc.

Mountain and forest dwelling communities traditionally preferred burning of wood over other fuels. With the supply of clean fuels including natural gas and LPG in many urban areas and some rural areas, the households are switching over to alternative fuels.

Forest-based livelihoods: Poverty is compelling the poor, in the absence of sustainable alternative livelihoods, to rely on forests. Governments and donors do not have any significant programme for compensating forest communities for acquiring or not using their legal or traditional rights of harvesting beyond sustainable limits. This trend, if it remains unchecked, will have drastic implications in the form of irreversible loss of forest resources at an unprecedented pace.

There is a general perception that during the last 15 years of the formal ban on timber harvesting, large-scale degradation and deforestation of natural forests took place in northern Pakistan through illegal felling. The MOE and the NWFP Forest Department, in collaboration with Swiss Inter-corporation (IC), are undertaking a study in this respect for taking an informed policy decision on continuing or relaxing the ban on timber harvesting by introducing conditionality.

The local governments and civil society organizations are making efforts to promote alternative livelihoods, in particular NWFP-related livelihoods. It is expected that by 2020, a significant share of income among forest-dependent communities will come from NWFPs and services.

Impact of globalization and regional and sub-regional integration

Pakistan is a low forest cover country and presently not a party to ITTO. The WTO mainly deals with international trade in forest and agricultural products. The forest products being exported from Pakistan, which may be affected by the WTO, are finished and semi-finished timber products. Pakistan is mainly importing timber, pulp and paper.

The forestry projects focusing on climate change are not likely to face difficulty in accessing funds.

Pakistan is a party to many MEAs including UNFF, CITES, CBD, CMS, UNCCD, UNFCCC/Kyoto Protocol, Ramsar Convention and World Heritage Convention. These conventions are being implemented with varying degrees of interest and effectiveness, financial resources and technical expertise being the constraints.

Restrictions on trade of some forest-related plant species such as Kuth (*Sussurea* spp) under CITES may limit the scope of conventional and non-conventional utilization of certain forest products.

Pakistan has not yet promulgated biodiversity laws regarding access and benefit sharing, and protection of indigenous and traditional knowledge as required by the CBD. These laws will help Pakistan make substantial developments in the forestry sector by providing legal cover to communities' custodianship of genetic resources in certain types of forests.

Pakistan has not yet developed an adaptation plan to cope with the impacts of climate change and for mitigation measures. However, the MOE is developing "Pakistan's National CDM Strategy" and is providing technical support for preparation of CDM projects relating to the forestry sector. The Kyoto Protocol's CDM may provide international resources for forest communities to benefit in lieu of their forest-related activities regarding carbon sequestration and maintaining carbon sinks.

Finally, Pakistan and the international community have to achieve the four global objectives of SFM under the UNFF's Non-Legally Binding Instrument on Forests (NLBI).

Pakistan has to fulfil its MDG commitments to increase area under forest from 5% to 6% by 2015. This is a huge task to bring more than 1 million ha of new lands under forest cover. However, strategies, plans and programmes, both at provincial and federal levels, have been prepared and funding is available to implement these programmes.

Technological changes within and outside the forest sector

In comparison with other sectors like agriculture and industry, introduction and adoption of technology in the forestry sector in Pakistan is negligible. Forest management is still based on old principles and practices. Some improvement, however, in forest inventory through satellite imagery, GIS and GPS has been seen. There is still no innovation in raising nurseries, planting, efficient irrigation methods, other production-related forestry operations and forest protection measures (pest, disease control).

Although research on the technical problems of forestry, involving technology, has been ongoing, the forest departments are not receptive and capable of using the research results. Even the techniques developed successfully through donor-funded projects have not been replicated or scaled up.

Unfortunately, prescriptions of forest working plans could not be implemented in the past due to financial and other constraints, which culminated in overexploitation of forest resources. In order to avoid further deterioration, the government imposed a ban on commercial felling in 1992. Currently, natural forests in particular are being managed without planning. Officially, only dead and dry trees are extracted for meeting minimal local demand of timber or earning revenue.

Environmental issues and policies and their impact on the forest sector

Deforestation or loss of forest cover is itself considered the most important environmental issue in Pakistan. The main underlying reason, as described earlier, is the gap in supply and demand of wood. Droughts, forest fires, floods and earthquakes have also had impacts.

Biodiversity loss from natural forests is another important issue. Pakistan developed the Biodiversity Action Programme (BAP) in 2000, which is not being implemented effectively. Since foresters are trained mainly on silvicultural management of tree species, they do not have competencies to incorporate biodiversity in forest planning and management, and implementing such plans, programmes and projects. Despite national and international efforts, it is feared that the status of forest ecosystems, species and genetic diversity will continue to decline in Pakistan.

The riverine forests have also been affected badly by reduced or no flooding due to abstraction and extraction of water from the rivers by building mega dams and barrages. Reduction in freshwater flow in the Indus River leading to sea water intrusion in the entire deltaic region and increase in salinity in the Indus Delta has been the major reason for decline in mangroves.

Poverty is a serious challenge in Pakistan and affects the sustainability of forest and other natural resources.

Forest policies: The policy directions regarding SFM and ensuring regeneration could not be implemented. In the past, forest policies failed to take into account alternatives for wood and the sustainable livelihoods of local people.

Summary of key factors that are likely to impact forestry in the next 20 years

Currently, the forestry sector is confronted with many challenges including deforestation; massive degradation of forests, watersheds and rangelands; decline in their productivity; loss of biodiversity; soil erosion and desertification; reduction in environmental and recreational values; The main factor responsible for this situation is the heavy dependence of the ever increasing population, in particular the rural population, on forests for biomass energy and subsistence.

The underlying causes for this situation are:

- Rapid growth in human and livestock populations
- Heavy dependence of local communities on forest and other natural resources
- Conversion and degradation of forests into unsustainable forms of land use
- Imbalance in supply and demand of timber and other wood products, in particular for household energy
- Reduced environmental flows in rivers
- Ambiguous, complex and retrogressive land tenure systems
- Prolonged droughts, forest fires, floods, earthquakes, pests and diseases and climate change
- Lack of participation among and economic incentives for communities
- Transfer of forest lands for non-forestry purposes and forest land encroachment
- Shortage and inefficient use of irrigation water
- Lack of an SFM approach
- Weak institutions and weak enforcement or non-compliance with policies and laws
- Lack of intra and inter-sectoral coordination
- Lack of technologies
- Unsustainable development
- Lack of alternatives for wood and efficient wood use practices
- Lack of awareness on benefits of forests beyond wood and non-wood products

4. PROBABLE SCENARIOS AND THEIR IMPLICATIONS

Rationale for scenario definition

The following forestry situation in the country calls for defining the probable scenarios in the forestry sector for 2020:

- Continuously diminishing natural forest resources
- Increasing shortage of water; declining flows in rivers that have had significant adverse impact on the riverine forests and mangroves
- Reduced productivity of forest and rangelands
- Energy crises
- Reduced life span of mega and other dams
- Increasing imbalance in supply and demand of wood
- High prices of wood and wood products
- Need for changing or adjusting policy, legal, institutional and financial frameworks to improve the dismal situation

Elements used in defining scenarios

The parameters being used in defining the forestry scenario include historical trends projected for the future, key issues, social, economic and political changes, global developments as well as policy, legal and institutional regimes in the country (current) and in the next decade or so. History, trends and, key issues give very interesting insight in developing future scenarios. Some societal changes are likely in the next two decades and will have lasting implications on values, perceptions and uses of forests.

The following informed assumptions have also been made in defining the scenarios:

- Importance of forests would continue to grow fast in all segments of society
- Use of alternative fuel e.g. natural gas, biogas, LPG etc. by forest-dependent communities would increase e.g. piped gas in Ziarat Valley in Balochistan
- Perfection, replication and scaling up of experimental participatory planning and management of forests, e.g. joint forest management (JFM), is planned
- Harnessing of the great potential of farm forestry

The key factors, although most of these are external to forestry, are:

Social factors

- Further growth in human population although the annual population growth rate has declined. Further increase has multiple influences on society that affects the status of and trends in forestry
- Poverty is a serious challenge in Pakistan and affects the sustainability of forest and other natural resources. It still persists in rural areas although it has declined at the national level from the 30s to 20s in percent terms
- Improvement in literacy and awareness levels. There is lack of awareness of the limitations of forests and other natural resources and of the intangible benefits of forests, forest issues and motivation for positive action

Economic factors

- Imbalance in supply and demand of wood

- Energy crisis and shortage of fuelwood
- Import of timber, paper and pulp; export of wooden furniture and handicrafts
- Recognition of and payment for forest services
- Sustainable exploitation, value addition and marketing of NWFPs
- Forest-based industries;
- Access to efficient and clean technologies
- Economics of efficient irrigation and other technologies
- Supply and economics of alternatives for timber, fuelwood and other wood products
- Lack of alternatives for wood and alternative sustainable livelihoods

Demographic factors

The projected population growth is shown in Figure 15 (National Vision 2030) and Figure 16 (National Vision 2030).

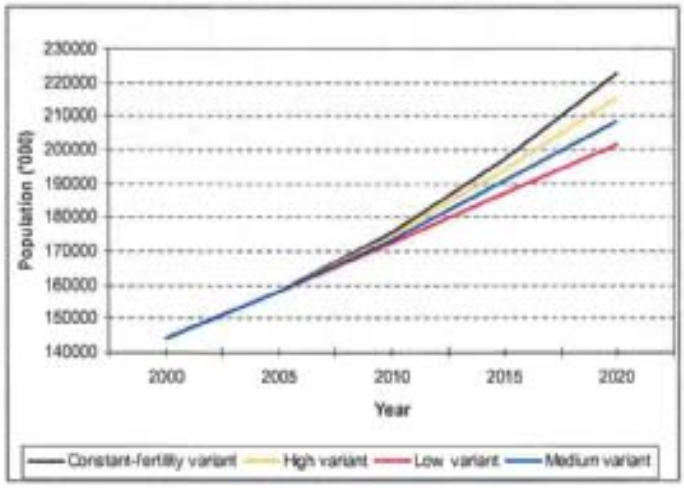


Figure 15. Probable population scenarios based on fertility variant (2000-2020)

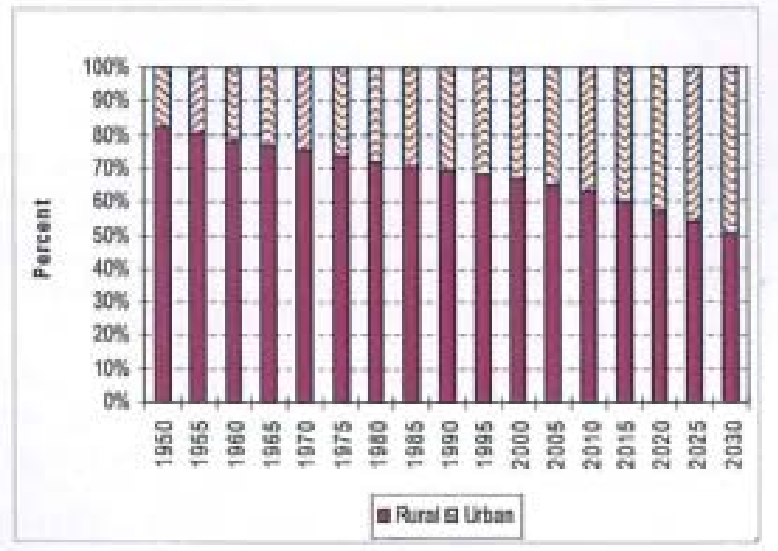


Figure 16. Trends in rural-urban population (1950-2030)

As a result pressure on forests will increase further. Other demographic elements are listed below:

- Lack of compliance with laws will prevail
- Household numbers will increase out of proportion due to disintegration of joint families and lifestyles will improve, requiring more wood for furniture and construction
- Rural-urban migration will increase
- Dependence on forest resources for subsistence and income will decline
- Awareness, literacy, attitudes and behaviours will improve

The first two bullets above will have negative impacts on forests while the impact of the remaining three will be positive.

Political factors

- Short-term vision and priorities resulting in low priority and support for forests and forestry resulting in low forestry budgets and status quo in policies, laws and forestry institutions
- Adverse political influence resulting in forest land encroachment, illegal felling of timber, fuelwood collection, livestock grazing, hunting of wild animals, and unsustainable or intrusive rural and regional developments
- Conflicting interests of some politicians, especially in North West Frontier Province
- Politicians are not comfortable with the community participatory approaches including JFM due to shift in the local power base
- Decentralization of forests and forestry from the provincial governments to the district governments, in particular in Balochistan has resulted in disfunctional forest staff

Institutional development

- Increase in staff numbers in the scenario of continuous decline in natural forests but still the quality of human resources is weak for facing the challenges and remaining relevant and efficient in the changing ground realities and future needs
- There is little change in business as usual and introduction of new technologies
- Almost all indicators of good governance including professionalism, efficiency, quality, accountability, transparency are weak
- The use of information technology is, at the most, partial
- Institutional strengthening, capacity building and an enabling environment for staff are the main priorities

Factors internal to the forestry sector are policy, legislation, institutions, and are planning, management and monitoring related. These could be changed or adopted with ease compared with the factors external to forestry. But this has not been the case in Pakistan.

Some additional external factors include land-use decision making; land tenure; water for forest ecosystems (e.g. mangroves, riverine forests, irrigated plantations); marketing mechanisms for wood, NWFPs and forest services; national, regional and local developments; and political influence. Most of these are not favourable at present.

The business-as-usual scenario

Deforestation and degradation of natural forests will continue with a significant increase. However, tree cover on farmlands will increase considerably.

The future trends of forest area predicted by time series trend analysis using linear models for four provinces, Northern Areas, AJK and Pakistan are shown graphically by solid red lines in Figure 17 (PFI, 2004).

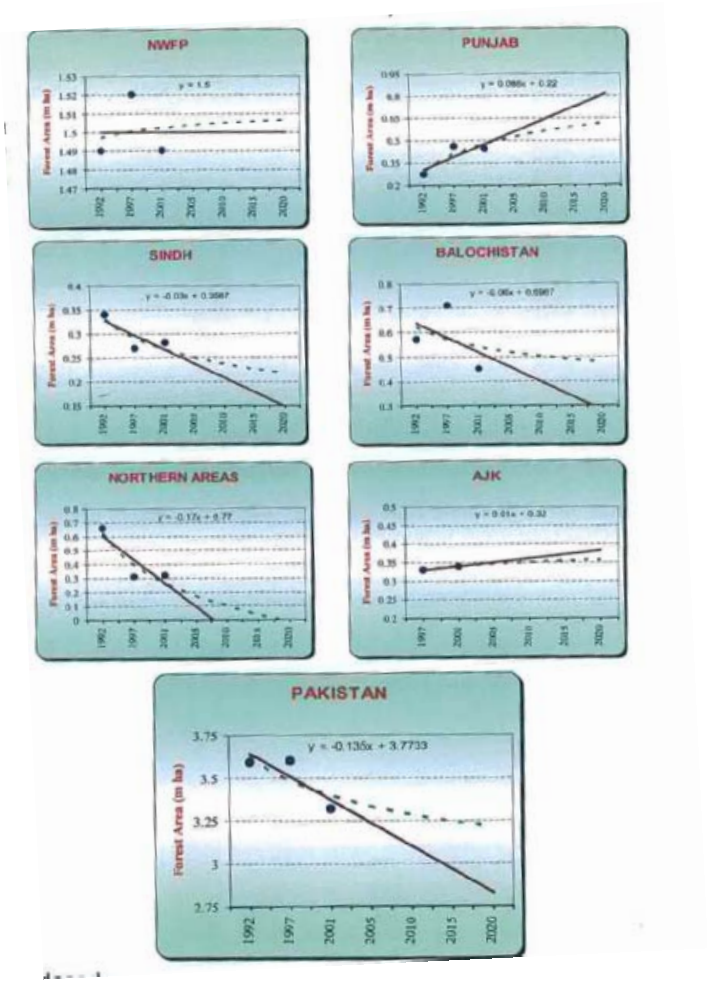


Figure 17. Forest/tree area projection in Pakistan, provinces, AJK & NA (1992-2020)

These trends of original values of forest areas for 1992-2001 are represented through a bar chart in Figure 18 (PFI, 2004).

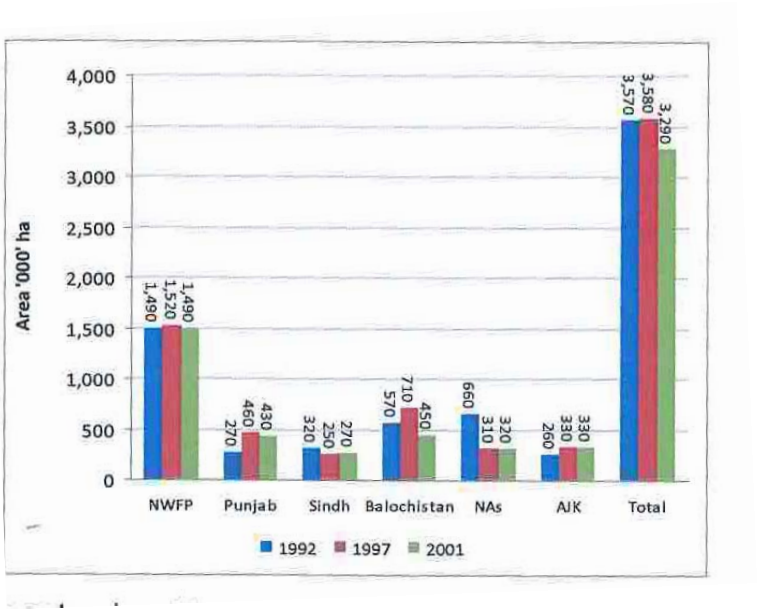


Figure 18. Trends in forest areas in Pakistan during 1992-2001

Forecast values of forest areas in Pakistan for 2005-2020, are shown in Figure 19 (PFI, 2004).

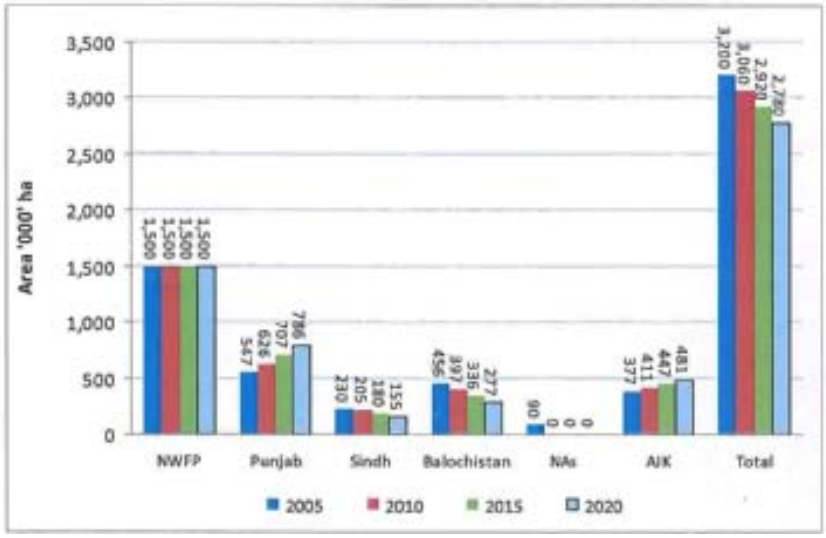


Figure 19. Trends of forecast values of forest areas in Pakistan for the years 2005-2020

Linear projections are interpreted as follows:

- No change in forest area in North West Frontier Province is predicted till 2020
- Punjab will have an increasing trend at a rate of 16,000 ha per annum tripling its forest area by 2020
- Forests will continue to expand in AJK at a rate of 7,000 ha per annum
- 23,000 ha per annum increase in forest area is expected in Punjab and AJK during the next two decades
- The forest area in Sindh will keep on shrinking at a rate of 5,000 ha per annum. At this rate Sindh will lose half of its existing forests by 2020
- Deforestation is likely to continue in Balochistan at 12,000 ha per annum, the province losing half of its existing forests by 2020

- The highest decline was forecast for Northern Areas i.e. at a rate of 34,000 ha per annum. This projection is far removed from reality as there is no likelihood of complete deforestation by 2010
- The conclusion from these predictions is that Balochistan, Sindh and Northern Areas will lose a total of 51,000 ha per annum during the next two decades

The net result of the linear model forecast for the four provinces, NAs and AJK predicts decrease in total forest area of Pakistan at a rate of 28,000 ha per annum till 2020. In other words, the total forest area of Pakistan is likely to be 2.78 million ha in 2020 against 3.29 million ha in 2001.

But linear analysis is not appropriate for forests because of the complex and variable natural and human factors influencing them.

At a certain stage in the future, forest areas in the provinces, NAs and AJK would stabilize and complete deforestation of any forest type would certainly not happen in Pakistan notwithstanding the high rate of deforestation of natural forests recorded in the past.

A little closer to realistic predictions of the future of forests and rangeland resources is seen in smoothing or logarithmic trend analysis based on the data of 1992, 1997 and 2001 as shown in Figure 25. According to this analysis:

- North West Frontier Province will increase its total forest area by a total of 10,000 ha within the next 15 years
- In Punjab, total forest area will level out between 0.5 and 0.6 million ha by 2020
- In Sindh, the total forest area will not drop below 0.22 million ha by 2020
- Balochistan will be able maintain at least 0.5 million ha of forests by 2020
- Northern Areas are likely to lose nearly all natural forests by 2020. This again is not a realistic prediction
- AJK is expected to maintain its total forest cover at around 0.35 million ha
- In Pakistan, the forest cover of 3.29 million ha in 2001 will decline to 3.22 million ha by 2020. Loss of 70,000 ha in 20 years means that the rate of deforestation in the first two decades of the 21st century is likely to be 3,500 ha per annum, which again is a very conservative estimate. Natural forest cover will probably stabilize around 3.25 million ha at the national level

Time series or linear trend analysis for different forest types at the country level has been done for 1992, 1997 and 2001 and projected for 2005, 2010, 2015 and 2020. The results are shown in Figures 20, 21, 22, 23, 24 and 25.

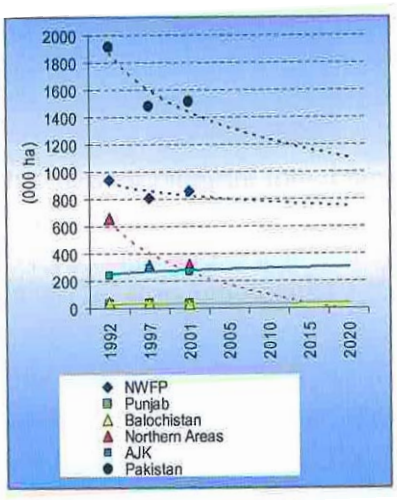


Figure 20. Future scenarios for coniferous forests in Pakistan (1992-2020)

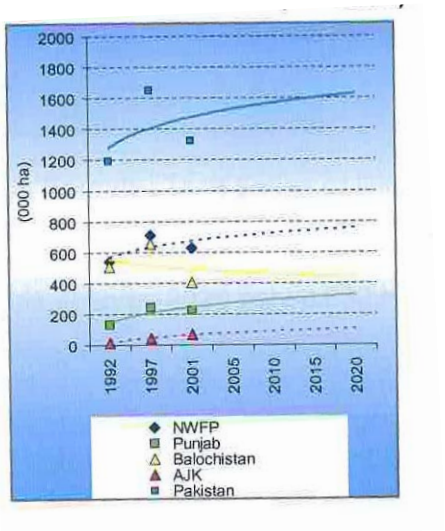


Figure 21. Future scenarios for scrub forests in Pakistan (1992-2020)

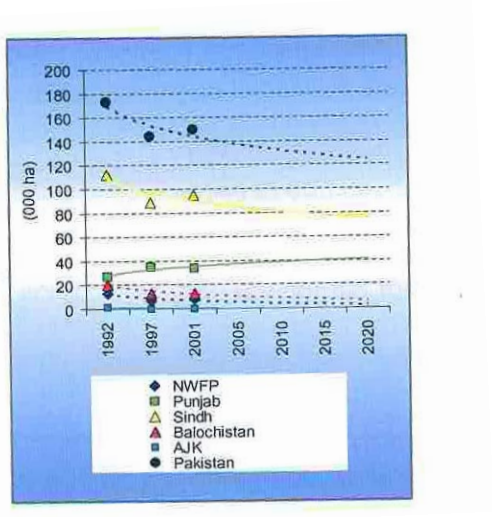


Figure 22. Future scenarios for riverine forests in Pakistan (1992-2020)

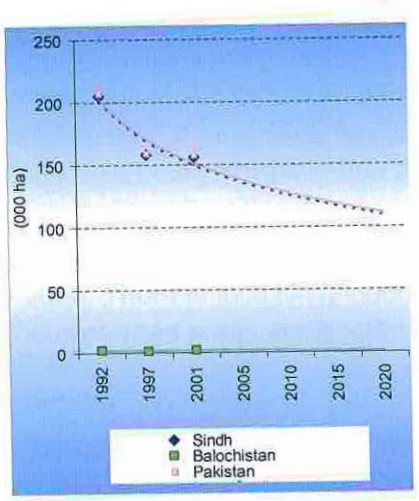


Figure 23. Future scenarios for mangroves in Pakistan (1992-2020)

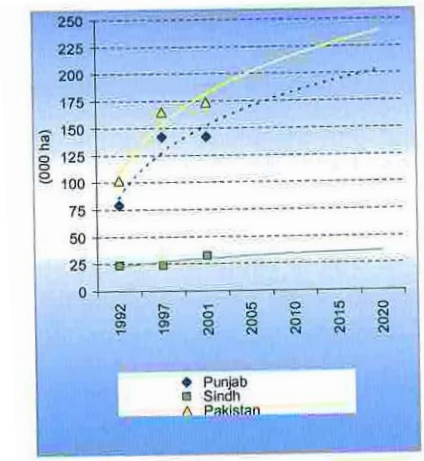


Figure 24. Future scenarios for irrigated plantations in Pakistan (1992-2020)

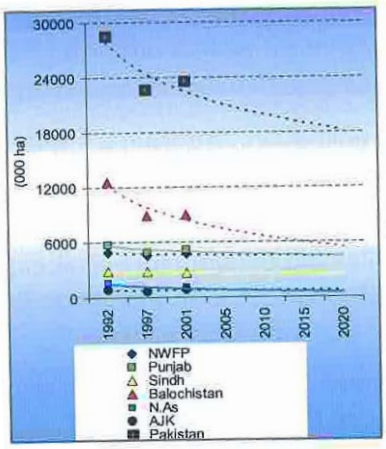


Figure 25. Future scenarios for rangelands in Pakistan (1992-2020)

Coniferous forests: Time series or linear trend analysis up to 2020 for different forest types at the country level indicated that the total area under coniferous forests is expected to decline at the rate of 40,100 ha per annum. If Pakistan is really unfortunate to have this high rate of

loss in the next two decades, then by 2020 only 0.632 million ha of coniferous forests will be standing against 1.512 million ha in 1992 (Figure 20).

Forest planners, decision-makers and managers are certain that loss of forest cover will not be to this extent but will slow due to government policies, programmes, mega projects, rigorous efforts through scientific management and sufficient funding to attain equilibrium at 1.5 million ha. Smoothing trend analysis predicts that within the next two decades, total forest area under coniferous forest will level out at around 1 million ha (Figure 20). The fastest rate of deforestation of coniferous forests is predicted in Northern Areas followed by North West Frontier Province (NWFP).

Scrub forests: Linear trend analysis predicted that scrub forests are likely to expand at a rate of 13,200 ha per annum reaching a total area of 1.719 million ha by 2020 from the existing 1.323 million ha .This may be due to deterioration of coniferous forest into scrub. Mostly this will happen in North West Frontier Province, Punjab, and AJK as happened during 1992 to 2001. Balochistan will continue to lose scrub forest cover at a faster rate than other provinces due to overexploitation and droughts. Smoothing trend analysis, however, predicted that Pakistan will be able to maintain at least 1.6 m ha by 2020 (Figure 21). In Balochistan, despite the high rate of loss of scrub, at least 0.4 million ha will survive by 2020. There is less likelihood of reconversion of scrub areas into coniferous forests even if those converted areas are treated in future.

Riverine forests: Linear analysis has revealed that the riverine forests in Sindh are expected to decline from 95,000 ha in 2001 to 60,000 ha in 2020 at the rate of 400 ha per annum but smoothing trend analysis has predicted that total riverine forests in Pakistan will stabilize at around 120,000 ha by 2020 (Figure 22).

Mangrove forests: The linear models predicted that the total area of mangrove forests in Sindh and Balochistan will decline from 158,000 ha (2001) to 52,000 ha by 2020 at the rate of 4,900 ha per annum with complete deforestation by 2030, which is unlikely in the wake of ongoing efforts of governments and NGOs to protect and rehabilitate mangrove forests. According to smoothing trend analysis, Pakistan will be able to retain at least 100,000 ha of mangrove forests by 2020 despite high rates of deforestation during the last decade (Figure 23).

Irrigated plantations: According to linear trend analysis, the irrigated plantations of Punjab and Sindh are likely to expand at a rate of 3,900 ha per annum with increase in total area from 174,000 ha in 2001 to 254,000 ha by 2020. Smoothing trend analysis has yielded a similar result (Figure 24). But prediction for irrigated plantation does not seem realistic due to limitations of land and water in competing use for agriculture. Official records of Punjab and Sindh forest departments confirm that since 1992 very little new area has been brought under irrigated plantations.

Landsat TM interpretation showed that the area under irrigated plantations doubled during the same period. It needs re-checking since new tree cover was mainly raised on farmlands and some orchards might have been misinterpreted as irrigated plantations due to their resemblance on spectral signatures. The present area of 174,000 ha is likely to last up to 2020.

Future trends in rangelands: According to linear trend analysis, the area under rangelands was forecast to shrink from the existing 23.54 million ha in 2001 to 12.49 million ha by 2020 or halved in two decades at an alarming rate of 496,100 ha per annum (Figure 26). The fastest rate of loss is expected in Balochistan, where the total area under rangeland will decline from 8.9 million ha in 2001 to 4 million ha in 2020.

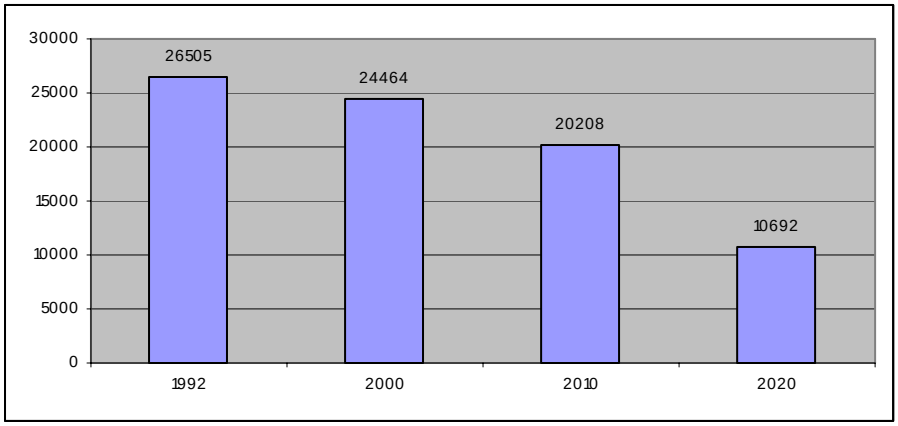
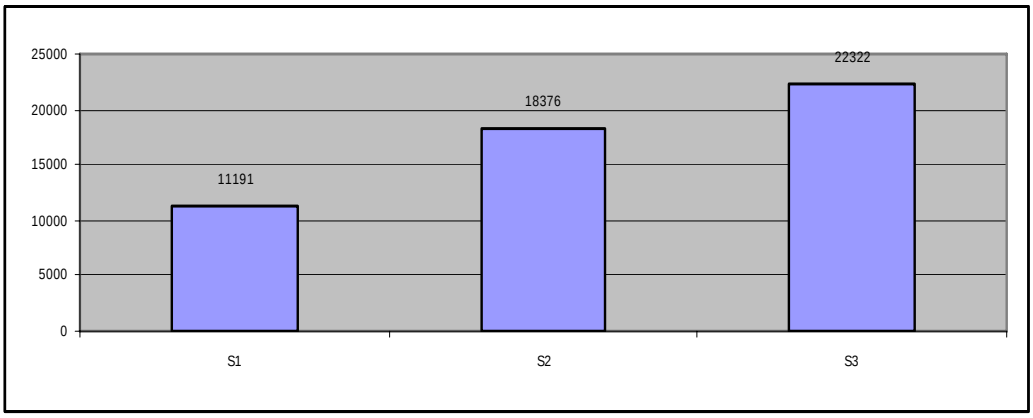


Figure 26. Change in rangeland cover of Pakistan (1992-2020) ('000 ha)

Smoothing trend has predicted that the rangelands in Pakistan will stabilize at 18 million ha by 2020 (Figure 25). This analysis is more realistic subject to reservations expressed in the foregoing paragraphs.

Probable shifts and alternative scenarios

Three scenarios of change in vegetation cover in Pakistan by 2020 are shown in Figure 27.



S1: State of forest when human and natural factors' influence is doubled under this Scenario
S2: State of forest when human and natural factors' influence is half under this Scenario
S3: State of forest when human and natural factors' influence is improved by 10% under this Scenario

Figure 27. Scenarios of change in vegetation cover in Pakistan by 2020 ('000 ha)

All of these projections are oversimplifications and overestimations of rate of change. Although rangelands suffered badly from many long-spell droughts in the 1990s and also by overexploitation, there is a decline in their grazing potential but there is no likelihood of significant loss in the area of rangelands due to likely conversion of scrub forests and lands under other uses, e.g. irrigated agriculture and orchards in Balochistan into rangelands due to overexploitation of their vegetation and groundwater respectively.

Timber consumption, based on the estimated population of 153.73 million and current per capita consumption of 0.0796 m³ would increase from 12.238 million m³ in 2003 to 16.326 million m³ in 2018 at a 1.94% annual increase. Total projected demand of wood for 2018, including fuelwood and industrial timber will exceed 43 million m^3 by 2018. The projected

consumption of wood (use wise) and in relation to population in Pakistan (1993-2018) is shown in Figure 28 (FSMP 1992) and Figure 29 (PFI, 2004) respectively.

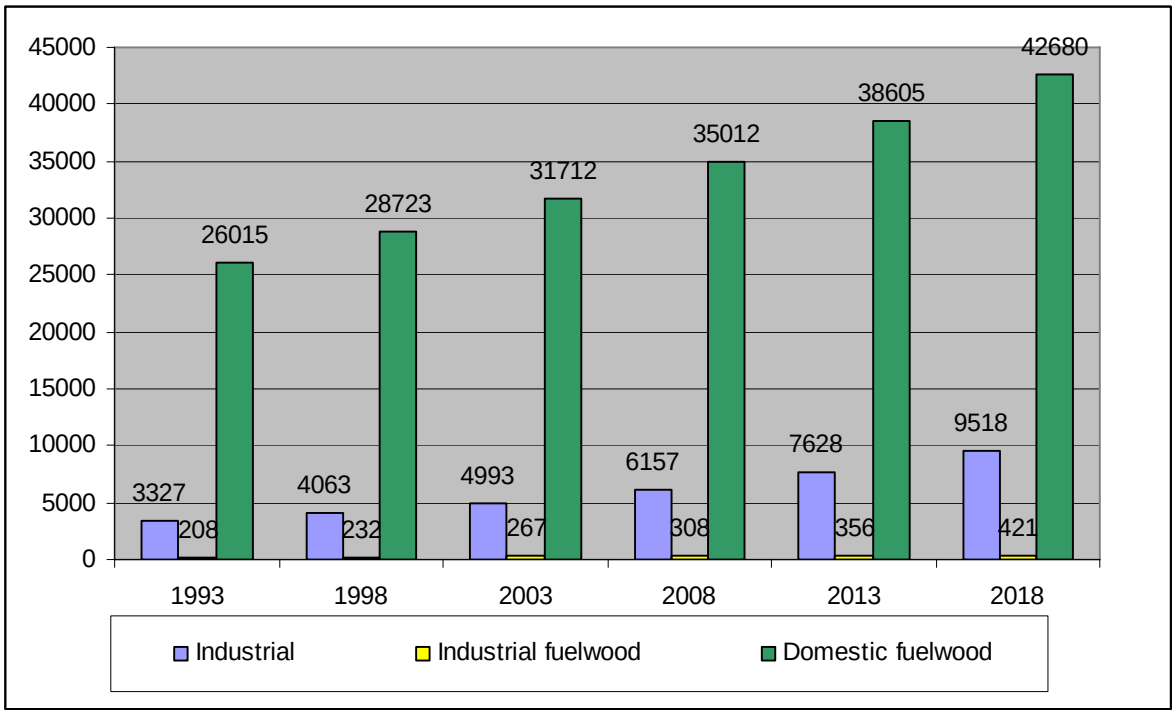


Figure 28. Projected consumption of wood (use wise) in Pakistan (1993-2018) ('000 m^3)

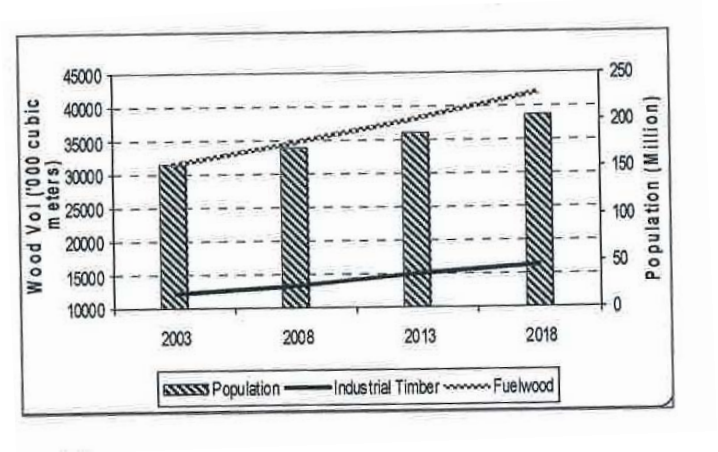


Figure 29. Projected trends in population and wood demands (2003-2018)

According to the projections, domestic use of fuelwood and industrial use of wood will increase significantly but the use of industrial fuelwood will remain static. However, the envisaged increase in the projections, especially for fuelwood appears to be on the higher side considering the reduced population growth rate per annum and the use of alternatives for fuelwood.

The factors that will have significant influence on the future scenarios, are listed:

- Use of alternative fuels will increase significantly

- Forest services will be recognized and paid for; compensating the communities, private owners, right holders and the poor non-right holder forest users for foregoing exploitative use
- Climate change-related forestry developments and improvement will take place, which will further increase forest resources
- Tree cover on farmlands will increase significantly, Up to 5% of farmland area will come under tree cover by 2020, provided the supply of alternative fuels in rural areas is sustained and regular marketing of wood to feed wood-based industries takes place
- Watershed management, including new plantations, will be boosted for value adding of the benefits of at least five mega dams that are being planned currently for construction within the next decade or so
- The natural forests will decline in the short term but inch towards stability after a decade from now

The most likely situation

- The natural forests will degrade further at least at the rate of 0.67% annually
- The standing volume of trees on farmlands will increase at the rate of 3.68% per year
- Generally, the watersheds and rangelands will degrade further. However, the water sheds of mega dams will start receiving attention for improvement
- The government's main thrust is going to be on bringing wastelands mainly under tree cover and to increase trees on farmlands
- The trend of conversion of coniferous forests on steep hillsides for cultivation will slow down due to low productivity and profitability of agriculture
- The ban on commercial harvesting may be lifted but regeneration of felled areas will get more funding and attention
- Irrigation water supplies will continue to decrease and irrigated plantations will suffer more from water shortage in the future
- Use of wood, as fuel, will no longer be a cheaper option in the wake of inflated rates of forest labour and transportation charges of fuelwood
- The use of alternatives for timber (construction material and furniture made of iron etc.) and fuelwood (natural gas, biogas and LPG, off-grid small and medium hydropower in mountains) will increase significantly
- The share of the forest sector in providing employment will decline slightly. However, some opportunities for employment will be created for qualified foresters to work with NGOs and the private sector. But the impact on the overall situation of employment will not be significant. Employment in the wood-based industry is likely to stay at the current level till 2020, because expansion of wood-based industry is not foreseen. There is a slight hope for generation of employment in the timber trade, if imports are liberalized or subsidized. There are some indications that non-conventional sources of income from forests will generate more employment opportunities, e.g. ecotourism use of forests will increase but the share of the forest sector in overall national employment figures will remain insignificant without monetizing and accounting for forest services
- Participatory management will improve and increase with institutionalization of the concept and an enabling environment for it in policies, laws etc;

5. FUTURE SCENARIOS OF FORESTRY IN PAKISTAN BY 2020

Forest resources in the next two decades

All indications are that the cover in the natural forests would decline but its accurate prediction is difficult due to multiple and complex human and natural factors. As mentioned in the previous chapter, smoothing trend analysis for 1992-2020 is close to being realistic subject to reservations expressed earlier.

The likely change in forest cover in different provinces and the country is shown in Figure 30 (PFI, 2004).

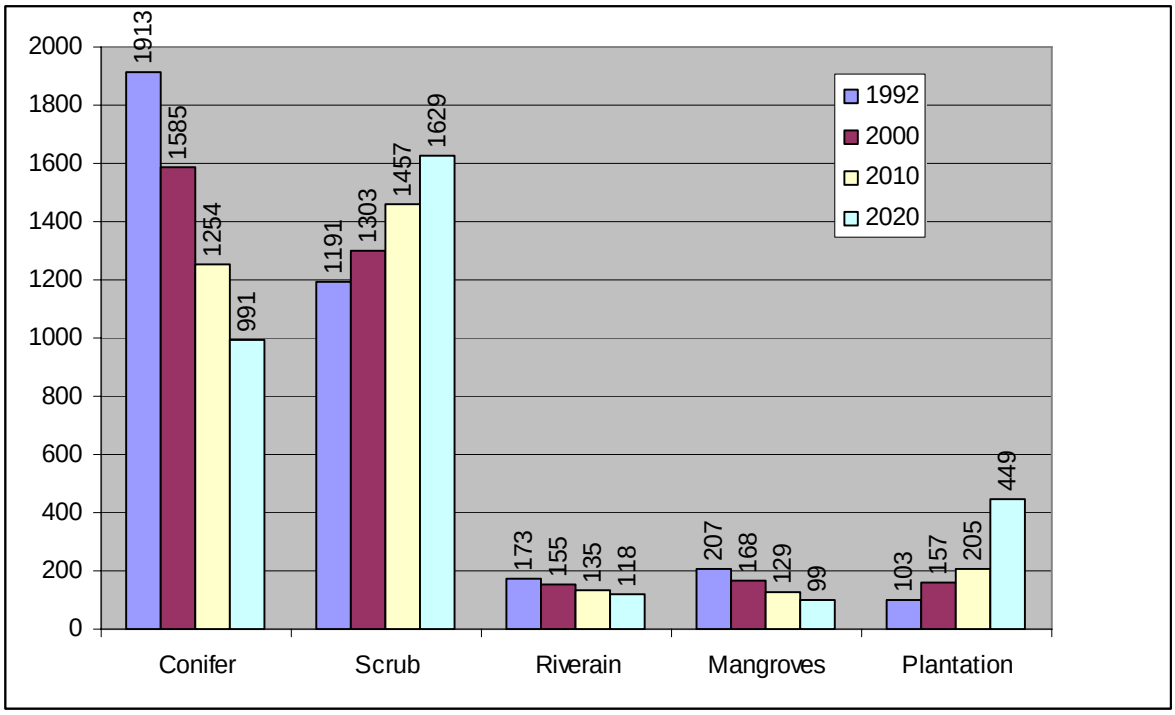


Figure 30. Forecast time series/linear data analysis of forest types for wood volume (2005-2020)

Wood and wood products

Timber consumption would increase from 12.238 million m³ in 2003 to 16.326 million m³ in 2018 exceeding 43 million m^3 by 2018. Forest-type forecast for wood volume through time series analysis/linear data for 2005-2020, is shown in Figure 31(PFI, 2004).

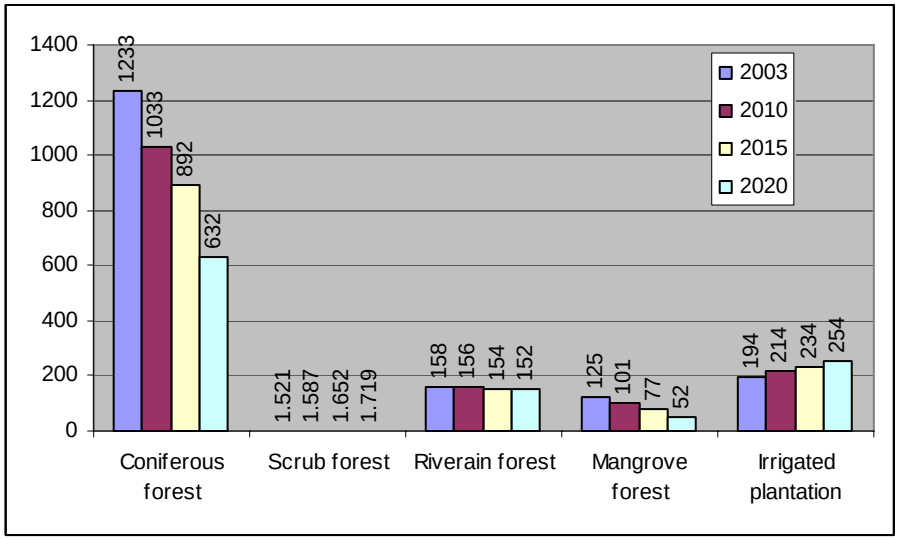


Figure 31. Projected change in forest cover of Pakistan (1992-2020)

The wood consumption by provinces for 2003-2018 is shown in Figure 32 (FSMP, 1992). The consumption is expected to increase from 43.716 million m^3 in 2003 to 59,768 million m^3 in 2018.

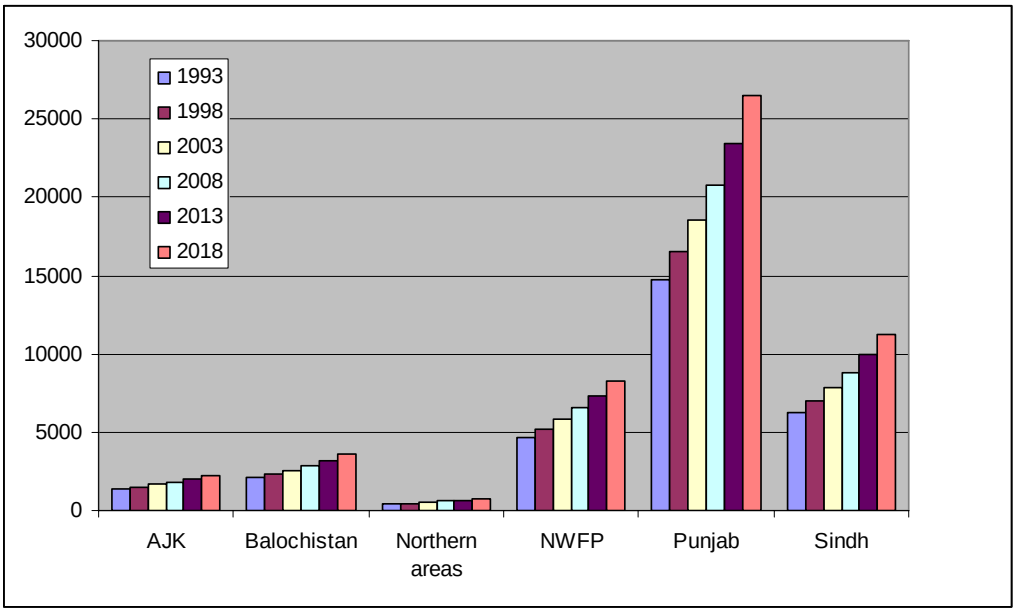


Figure 32. Wood consumption projected by province for 2018

Punjab, Sindh and North West Frontier Province rank 1, 2 and 3 in consumption and their consumption will almost double by 2018 according to these projections. Considering the existing forest resources and potential for increase in wood supply in these provinces, Punjab and Sindh will have to start mega projects of tree planting on farmlands as well as for increasing the productivity of irrigated plantations and riverine forests.

The supply-demand gap of wood by province/unit for 2018 based on 2003 data is shown in Figure 33 (PFI, 2004).

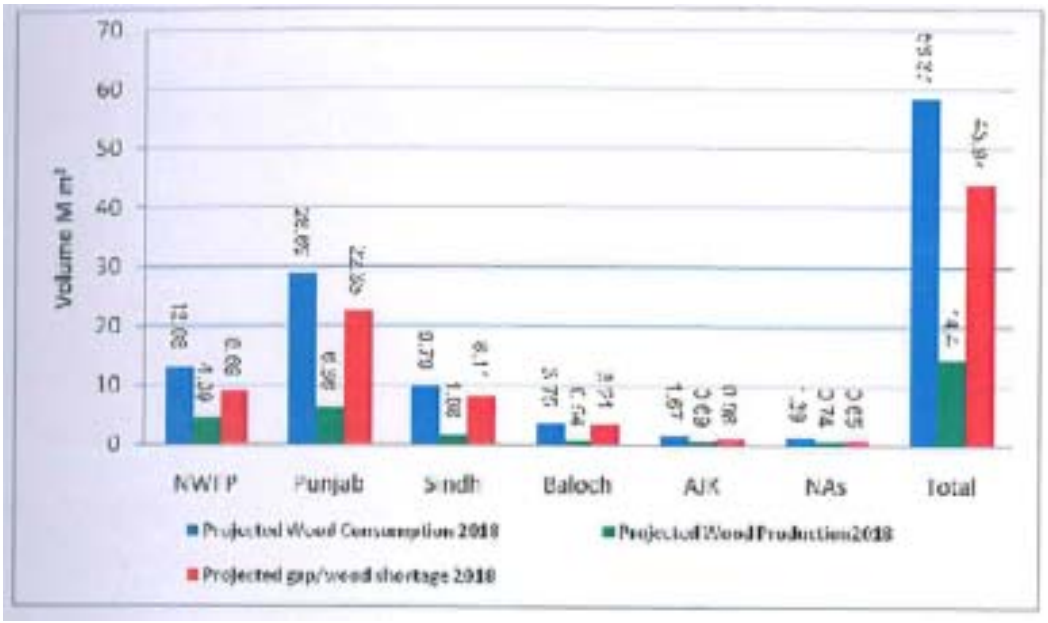


Figure 33. Supply-demand gap of wood by province/administrative unit (2018)

However, the situation will not be as simple because a number of other influencing factors including natural gas and other alternative, subsidized clean fuels for forest dwellers in the future will definitely reduce the pressure on forest for fuelwood. Import of natural gas from Iran, Qatar and Central Asian States will be helpful in this regard.

The future scenario regarding wood and wood products is expected to be as follows:

- Large gap in supply and demand of wood
- Less and less supply from natural forests and more and more from farmlands and imports
- Improved supplies and enhanced use of alternatives for wood and wood products
- Imports of timber, paper, pulp, finished wood products

Wood as a source of energy

According to linear trends, fuelwood demand would increase from 31.523 million m³ in 2003 to 42.051 million m³ by 2018 on existing per capita consumption of 0.205 m³ and population growth rate of 1.94%. The projected fuelwood demand for 2018 based on 2003 data is given in Figure 34.

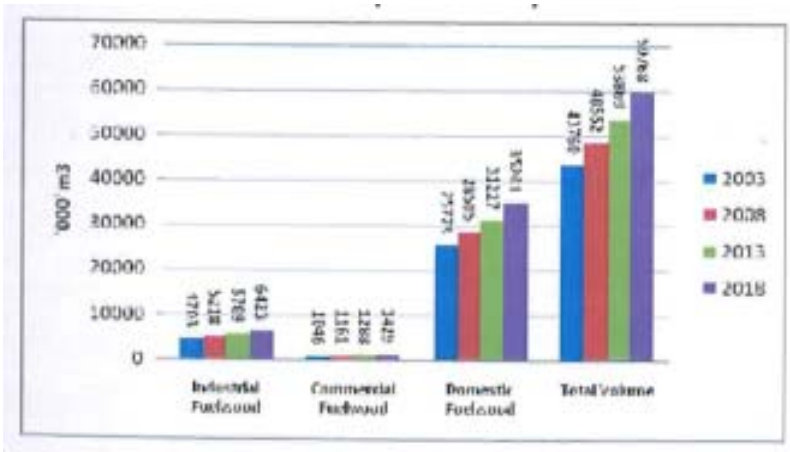


Figure 34. Projected consumption of wood (use wise) in Pakistan (2003-2018)

The future scenario regarding wood energy is that the demand for wood would increase in the short and medium term but would stabilize in the long term with import of natural gas and LPG, and development of small, medium and mega hydropower, biogas, solar and wind energy and Thar coal reserves as well cost effective technology for use of the new sources of energy.

Future of non-wood forest products

Significant progress is foreseen in sustainable exploitation, value addition and marketing of NWFPs, especially medicinal, aromatic and other economic plants in the future.

Service functions of forests

The recognition and establishment of a payment system for forest services in Pakistan will take a long time and the process will be very slow. However, some mechanisms may be developed in a couple of years from now for compensating the forest owner communities, individual owners and the poor non-right holder users for foregoing commercial harvesting of timber.

Social functions of forests

The social functions of forests, in particular water for drinking and agriculture, recreation and ecotourism, medicinal, aromatic and economic plants, and cultural and spiritual practices will get emphasis. Wildlife and biodiversity conservation apropos ecotourism resources and local natural heritage will improve in the potential areas if the local communities are given economic incentives for their sustainable use.

Collection of fuelwood and timber and grazing of livestock are likely to increase in the short and medium term due to increase in demand for fuelwood and significant increase in the prices of livestock and their products respectively. The rural masses will continue to seek comfortable living involving use of alternative fuels which will impact forest resources positively. The federal government, as its long-term policy, will provide natural gas to most of the settlements and in particular to the towns and villages located close to forests, for example, Murree Town and urban areas in Mansehra District.

In future, wooden rafting will be largely replaced by concrete or iron girders or G.I.S roofs. Similarly, doors and windows will use composite (imported) products, glass, aluminium, steel and iron. The overall impacts of improving living standards and housing patterns will be positive and will counterbalance to some extent the need for construction wood for increased housing.

An overview of the future of the country's forests and forestry in 2020

Natural forest cover of all types will continue to decline. The projected increase in the area of scrub forest would not be due to improvement but as a result of conversion of coniferous forests into scrub. This would impact the nature and quality of forest cover with no effect on the total forest area. The envisaged large reduction in the area of range lands, especially in Balochistan will not happen due to limitations for change in land use for agriculture and orchards for want of ground water, which is depleting fast. In the long term i.e. beyond 2020, Balochistan will be reverting to livestock husbandry.

Meeting the target of increasing the forest cover to 6% by 2015 would be a big challenge if the shortfall in forest cover of the natural forests, due to deforestation, is to be made simultaneously. There is also no likelihood of significant increase in the area of forest cover

in the state-owned irrigated plantations as envisaged in the projections since water scarcity is likely to increase. However, with the present emphasis and efforts continuing, the forest area may increase up to 6.25% by 2020. Certainly, the standing volume of trees on farmlands will continue to increase at about 4% on average up to 2020.

The future scenario for forests and rangelands in Pakistan based on smoothing trends analysis, current and future policies, strategies, programmes and mega projects of federal and provincial governments as well as the likely influence of social, economic, technological, regional and global factors is expected to be:

- Forest cover will decline significantly in coniferous forests and mangroves, although the area may not decline significantly
- The area of rangelands in the country will not decline but their productivity will decline further
- The management of watersheds of existing mega dams will improve and that of new projects will be taken up earnestly
- The productivity of existing state-owned irrigated plantations will decline although the area may not decline significantly. There is no likelihood of significant increase in area under this class
- Trees and small plantations will increase significantly on farmlands and waste lands which cannot be used for agriculture due to various constraints, e.g. water, soil quality
- Government commitment will increase forest cover from 5.01% to 6.0% by 2015 and 6.25% by 2020 by enhancing budgetary allocations for the forestry sector and providing economic incentives to other stakeholders
- Conservation and development of forests will be the guiding principles of future management rather than commercial exploitation without ensuring regeneration
- The role of forests in providing subsistence needs to local communities and environmental services would increase. As a result, their commercial function to earn revenue for local governments would lose importance
- Governments, communities, farmers, donors and NGOs are expected to expedite their multi-pronged efforts to reduce pressures on natural forests and increase the forest cover in potential areas
- Fuelwood alternatives, in particular LPG, natural gas, biogas, solar heaters and timber substitutes e.g. as well as alternative sustainable livelihoods, will be encouraged
- The federal government is serious about benefiting from the CDM in the forest sector by accessing financial resources for the CDM
- Implementation of MEAs such as the CBD, WSC, CITES, CMS, UNCCD and UNFCCC/ Kyoto Protocol would gain momentum
- Income of communities from ecotourism would increase and alternative sustainable livelihoods of local communities based on natural resources would also increase
- Imports of timber, semi-finished and finished wood products, e.g. pulp, paper, plywood, chipboard, natural gas, LPG would increase significantly to meet the growing demands
- The role of forests in production of fuelwood would shift to a large extent from state-owned forests to farmlands

In light of the above situations, it can be assumed that subsistence and environmental services will mainly guide the management of natural forests in the long term.

6. HOW COULD WE CREATE A BETTER FUTURE?

Inherently, Pakistan is a forest-poor country, and deforestation and degradation of natural forests are taking place on a large scale in almost all areas. Addressing the underlying causes of the likely scenario is required for a better future for forests and forestry.

The main areas of focus for remedying the situation include:

- Sustainable use and management of natural forests, irrigated plantations, rangelands, watersheds, wider forest landscapes, wildlife and protected areas
- Forestry interventions for carbon sequestration and climate change mitigation
- Sustainable exploitation, value addition and marketing of NWFPs
- Alternative sustainable livelihoods including community based ecotourism and countryside recreation
- Prevention and control of forest fires, diseases, parasites and pests
- Enhancing irrigation efficiency in plantations
- Promotion of alternatives for timber and firewood
- Meeting the gap in supply and demand of wood and wood products, e.g. paper and pulp, through imports
- Safeguarding the forests from transfer of land for non-forestry purposes, encroachment
- Access to new efficient technologies
- Mitigating or reducing the adverse impacts of local or regional development initiatives on forests and negative influences of the factors external to forestry

The key approaches to remedying the situation are:

Although forests and allied resources have resilience to recover, they cannot withstand exploitation beyond their carrying capacity continuously without being allowed to regenerate.

Pakistan requires policy, legal, institutional and financial reforms in the forestry sector as well as institutional strengthening and competency development, stakeholder participation and an enabling environment for sustainable management of forest and other allied resources. The full potential of Federal Forestry Board should also be utilized to enhance the effectiveness of the Board.

Provincial governments should formulate their own strategies and action plans to achieve the goals and objectives of the national policy and MEAs to address their province-specific issues and priorities. They should undertake policy, legal and institutional reforms, learning from the experience of North West Frontier Province. The requirements of the CBD and other MEAs should be addressed by improving compliance with and enforcement of laws.

Forests as a natural renewable resource comprising land, water, trees and biodiversity are not only impacted by forest policies and people dependent on them but also by formal and informal policies and activities of other sectors. Cross-sector considerations in sector policies, plans, programmes and projects are critical to mitigate or reduce their adverse impacts on the forest sector and vice versa. This area is critical to reduce the negative influences of factors external to forestry.

Experience has shown that the sector approach to forest management and development has to change with an integrated natural resource management approach, involving multi-stakeholder participation, in particular to effectively address special environmental values of mountain watersheds, biodiversity, sustainability of agriculture etc. Demographic trends,

climatic change and development activities influence forests and other natural resources. Therefore, there is a need to incorporate forestry concerns in the policies of other sectors in order to mitigate and minimize their adverse impacts.

Planning and management of natural forests is complex and a long-term undertaking involving dynamic forest ecosystems, contrary to maintaining commercial plantations. A better future for forests can be created by adopting appropriate multi-pronged approaches keeping in view the current status of forests.

A two-fold strategy will enhance supply by raising extensive plantations on the one hand and reduce the demand for forest products on the other. Efficient use of inputs is also important in this regard.

Demand management entails behavioural changes on the one hand and provision of alternatives for timber, firewood and other unsustainable forest products on the other. Energy efficiency is also important in this regard. Thus there is a need to look for alternatives for natural forest, e.g. more trees on farmlands, alternative energy sources and efficient use of wood and inputs

By responding to the following challenges, we may aim at a better future for forests in Pakistan:

- Sustainable forest management of degraded forests requires non-exploitative use for recoupment. In the current situation, wood harvesting degrades forests further
- To move from an exploitation regime to non-exploitative use, e.g. ecotourism and sustainable use of NWFPs and prioritize
- Consider forest services rather than wood production exclusively. Forestry management in Pakistan has been pre-dominantly timber oriented so far and this has led to harvesting far beyond the carrying capacity of the forests
- Demand management through efficient use, tree planting on farmlands, forest landscape restoration, imports and alternatives
- Balancing need with availability as well as addressing the diverse needs of the stakeholders for a range of products has to be increased with less emphasis on timber and more focus on NWFPs and services
- Watershed services and forest management as barriers to natural disasters
- As a pre-requisite for SFM, integrating sound scientific and local best practices
- Gender integration is currently limited to donor-funded projects but gender mainstreaming is vital in planning, management, assessment, evaluation and benefit sharing
- A poverty reduction approach through alternative sustainable livelihoods for arresting and reversing the erosion of forest goods and services

Entrepreneurial orientation: SFM requires proactive planning, investment and involvement of all stakeholders. Community participation and public-private partnership in management of forests, biodiversity hot spots, protected areas, watersheds and rangelands is crucial, which is possible only if they clearly see ‘what is in it for them’. An entrepreneurial orientation of stakeholders can help to make it happen, but not at the cost of equity and carrying capacity.

Institutional reforms:

- The Pakistan Forest Institute (PFI), as the prime forestry research and education institute in the country, should be strengthened for a revised mandate and approaches including networking and incorporating comprehensive IT-based forest management

- Establishing a sound and scientific database geared to meeting the requirements of policy, planning, management and assessment of current global trends, the structure/staffing, etc.
- Strengthening the Office of the Inspector General of Forests for policy, coordination, and leadership role, accessing and providing funds and expertise to the provincial forest departments, interaction with donors, international and regional organizations and secretariats of MEAs, inter- and intra-ministry liaison, coordination with civil society organizations, access to and making new forest-related technologies available to the provincial forest departments

Forestry education: There is a growing realization that the curriculum for graduate courses at the PFI has not kept pace with the changing needs of expertise in the sector for example:

- Sustainable forest management
- Business management
- Participatory forest management
- Forest assessment, integrated planning and management, monitoring and evaluation
- Multilateral Environmental Agreements (MEAs)
- IT-based databases and operations (GIS, GPS)
- Forest management approaches other than legal options e.g. stakeholder participation
- Biodiversity conservation, protected area planning and management
- Forest production-related technologies including nurseries and regeneration; innovative ways of financing and environmental economics for valuation of forest services
- Efficient irrigation technologies
- Cost effective control of forest fires, weeds, pests and diseases
- Restoration of forests, protected areas, watersheds and rangelands after earthquakes as well as restoration of abandoned mining quarries
- SFM, business management, environmental assessment and participatory forest management

A system of updating knowledge and keeping abreast with new developments through refresher/in-service courses needs to be established at the PFI to enable the foresters to meet challenges being faced due to globalization including climate change and SFM.

Forestry research: Research should focus on policy research and applied research on priority forestry issues to be useful for policy makers and forest managers respectively.

Technological changes:

- Promotion of alternatives including clean energy, e.g. natural gas, biogas, LPG, solar, wind and wave energy
- Promotion and use of forest production-related technologies including, seed banks, tissue culture, nurseries, regeneration, cost effective alternatives for wood, technologies relating to NWFP-based small and medium enterprises

Regional and global collaboration is necessary: Knowledge management, accessing technology and capacity building are relevant in this context. Some of the most relevant regional organizations in forestry include RECOFTC, Thailand, which focuses on integrated natural resource management, ICIMOD, and the Indian Forest Institute (Dehra Dun). There is also scope for improving trans-boundary interaction with neighbouring countries. Enhanced collaboration with FAO, IUCN and WWF and UNEP, is required. The former three organizations have significant programmes including FAO's NFP Facility in Pakistan and are

interested in joint programmes with government agencies, in particular in testing new approaches and technologies for SFM.

Overall priorities and strategies: SFM requires proactive and effective involvement and commitment from civil society organizations, the public sector, the private/corporate sector and local communities. The enormous potential of the private sector needs full utilization because of its capacity in value addition and marketing besides investing financial resources. The civil society organizations have huge potential in social mobilization, whereas the public sector can contribute through an enabling environment, and its regulatory and advisory role. The communities are using and may also be managing the resources.

Investment requirements: Currently, the potential of investment by the private sector in forest production is limited due to the long-term gestation period. However, the opportunity to access financial resources from donors is reasonably high, e.g. from carbon trading and for PES, FSC certification/standardization of wood and NWFPs; at the moment donor funding for the forestry sector in Pakistan is negligible but there is great potential, provided appropriate and quality proposals are developed and submitted to donors expeditiously. However, the federal government is making heavy investment under the Mid-term Development Framework (MTDF) for meeting the forestry-related MDG of increasing forest cover percent from 4.8 to 6.0 by 2015.

In many countries, the private sector invests in forest management and associated processing and marketing activities. Ecotourism, biodiversity prospecting and payment for carbon sequestration in forests are some of the examples. Flexibility and creativity are hallmarks of the private sector. Encouraging public-private partnership in order to supplement financial, technical and managerial resources for SFM, FLR, ecotourism and NWFP-based small and medium enterprises and marketing would be useful; as would be the creation of new market places or becoming part of existing markets for trading forest services to protect, restore, and develop new and manage existing forests, using carbon trading etc. Forest services' payment mechanisms would be useful for enhancing forest cover.

Responding to changing societal needs: The long-term societal needs are SFM, regular and cheap supply of alternatvies to fuelwood and timber, promotion of private and community forestry and development of alternative sustainable livelihoods for communities living in and around forests for reducing their poverty and meeting their basic needs.

Within the forestry sector: The key measures that are within the purview of the forestry sector include:

- An accurate assessment of forest and allied resources is needed for their planning and management
- Local area strategies and mechanisms should be prepared and implemented with the participation of communities and other stakeholders for forest conservation, sustainable use, management and development of forests on which they depend for subsistence and livelihood by addressing the underlying causes of deforestation and degradation and increasing forest cover in forests, on farmlands and potential wastelands with economic incentives. Steps should be taken to adjust and notify land tenure and usufruct rights of local communities and individuals that are conducive to SFM
- Trends in forests and the influencing biophysical, ecological, societal, demographic, economic, sectoral policies, legal and institutional factors should be regularly monitored, periodically assessed, and their negative influences mitigated by taking measures. Mechanisms for information exchange with all stakeholders and knowledge management should be established

- An ecosystem approach that integrates the conservation of biological diversity and the sustainable use of biological resources should be promoted
- Pakistan needs to establish and expand networks of forest protected areas, buffer zones and wildlife corridors in order to conserve forest biodiversity
- FLR programmes should be developed and implemented to restore the degraded forests and improve the landscapes with plantations, avoiding monocultures and plantations of exotics
- The forest sivicultural systems need some adjustment, keeping in view the current objectives and future focus on forest services and NWFPs
- There is a need to develop, test and promote appropriate and environmentally sound regeneration and rehabilitation technologies for sustainable management of critical forest ecosystems
- Effective tree planting campaigns can reduce the high biotic pressures on existing forests
- Forest plantations should be promoted, in particular in areas where the natural forests have or are degrading due to overexploitation for subsistence use
- Efficient wood energy technologies must get priority in relevant forestry, agriculture and energy sector programmes and projects
- Provincial Forest Development Funds should be established to support SFM, FLR and development of new forest resources, in particular in the critical watersheds and other ecologically sensitive areas. A significant part of the revenues generated from goods and services of a forest must be ploughed back for improvement of that forest
- Capacity-building of all stakeholders and at all levels is critical and should be undertaken, in particular for transfer of new technologies with due consideration of traditional knowledge

External to the forestry sector: The key measures that are outside the purview of the forestry sector but are equally important, if not more, include:

- Population planning, in particular for the forest-dependent communities
- Skills development and promotion of alternative sustainable livelihoods including ecotourism and NWFP-based livelihoods and small and medium enterprises
- Development planning control that ensures continuity of use of land under existing forest and bringing additional lands under plantations as well as controlling any local, regional or national development that will have negative influence on the sustainability of forest
- Subsidized and regular supplies of alternatives for wood and wood products
- Integrating forestry concerns in local and regional planning
- Forest development for adding value, e.g. plantations in the watersheds of mega dams to reduce sedimentation of reservoirs
- Recognition of and payment for forest services
- Import of wood and wood products
- Public-private partnership, especially private financing of long rotation tree plantations
- Donor and government funding for forestry
- Legal regime and support in getting compliance in enforcement of laws
- Tax rebates on import of wood and wood products and their alternatives as well as economic incentives to control deforestation and degradation, and undertaking afforestation
- Expenditure out of the income from forest, which must be deposited in the exchequer
- FSC certification of forest products for higher prices of products from sustainably managed forests that are sold in international markets

Institutional changes:

- The IGF Office in the MOE, provincial, AJK and NA forest departments and wildlife departments, Pakistan Forest Institute (PFI) and Zoological Survey Department (ZSD) should be strengthened
- Capacity-building and competency development programmes for the staff of the above agencies and other stakeholders at national, provincial and local levels should be undertaken
- Forest-dependent communities are organized for participatory forest management, and public-private partnership should be encouraged for SFM projects
- Effective participation of stakeholders in decision making regarding forest planning, management, monitoring and evaluation processes should be promoted
- Education and research institutions should be encouraged to include forestry in their mandates and work

Technological changes: Encourage development, access, transfer and adaptation of technologies for enhancing efficiencies in production and utilization processe.

Regional and global collaboration: Pakistan can greatly benefit from the experience and technical assistance of countries and international and regional institutions having focus on forests and forestry for meeting its needs for institutional strengthening, capacity building, technology and knowledge management.

There is also a need to forge strategic alliance with regional and international forestry research institutions and networks to make forest research credible and cost effective. Effective implementation of forest-related MEAs and using the potential of international assistance, including the mechanism of 'debt-for-nature swaps' subject to eligibility of Pakistan, would be useful.

Enhanced financial allocations for forestry and allied disciplines for institutional strengthening, capacity building, and provision of incentives to communities and the private sector to enable them to sustainably manage and develop forest resources.

Bilateral cooperation with neighbouring countries regarding environmental flow in international rivers, watershed management, transboundary protected areas, migratory species of wild animals, and ecotourism would be very useful for all parties.

Overall priorities and strategies: The following strategies and priorities would help in making a transition towards a better future for conservation and development of forestry in Pakistan:

- Adopting SFM and FLR
- Undertaking valuation of forest goods and services for the national accounts and seeking political support on that basis
- Enhancing political support to the forest sector for agreeing to appropriate policy, legal, and institutional reforms and financial support on the basis of dependence of rural communities on forests for subsistence and the forest services from which the entire nation benefits
- Improvement in governance of forest and allied resources; establish and operationalize effectively consultative mechanisms at various levels and for various aspects of forestry for this purpose
- Adopting ecosystem approaches, and integrated planning and management of forest resources; new protected areas are critical for the protection and maintenance of environmental services

- Conserving forest biodiversity and establishing protected areas with appropriate legal designations in all forest ecosystems to conserve their best examples for posterity. Also undertaking their planning and management for making a difference
- Introducing mechanisms and using economic tools in both the forest and non-forest sectors to safeguard and improve forests and trees
- Supporting participation and capacity building of communities
- Raising awareness of all segments of society regarding the importance of forests, challenges being faced including deforestation and degradation and what they can do to improve the situation for present and future generations
- Improving law enforcement and implementation of projects
- Forging strategic alliances with regional and international institutions as discussed earlier

7. CONCLUSIONS

Key conclusions

- Pakistan is a forest-poor country
- The overall area of natural forests has decreased
- The area allocated to forest use and range lands, as on the books of the provincial forest departments, has not decreased, rather it has registered a small increase in certain provinces. This area is expected to remain static
- However, the overall forest cover in Pakistan inclusive of irrigated forest plantations has increased and this trend will continue
- The forest biodiversity, especially in the case of species of wild animals and their habitats, has suffered irreversible loss of great magnitude. This will continue
- The forests and rangelands cannot be managed sustainably due to overexploitation and lack of regeneration. Currently, the management approach is on extraction of resources with almost no management input and investment in production
- Forests and rangelands are not managed on sound SFM principles due mainly to insufficient technical competencies and inadequate financial resources
- Conversion of forest lands in the steep hilly areas is likely to slow down or even stop due to low production with high inputs
- High increase in the prices of livestock products offers incentive for raising more livestock. This would mean increased pressure of livestock on forests and rangelands for grazing
- Pakistan imports timber, paper pulp, paper, certain other wood products and dry milk to meet the gap in supply and demand. This must continue to avoid further unsustainable forest management
- Weak institutional framework, non-compliance or weak enforcement of laws, lack of an enabling environment for the forest staff and other stakeholders including communities and the private sector are also contributing to the current unhealthy situation. This situation is likely to improve
- Education and research in forests, rangelands, and biodiversity is not at an optimum level currently both in content and quality. This situation is likely to improve
- Participation of local communities and other stakeholders in forestry, rangeland management and biodiversity conservation is at an initial stage and requires serious efforts and institutionalization in policies and laws for success
- NWFPs have not received due attention so far. Their importance is going to be enhanced in the future, which would require focused attention on sustainable harvesting, value addition and marketing for ensuring long-term benefits to the local communities
- Forest service functions have not received any recognition and appreciation so far in Pakistan but the time is just ripe to take the concept forward for input in the national accounts, and compensating the forest owner communities and individuals as well right holders who are deprived of monetary benefits on account of the ban on felling of timber since 1992
- The use of alternatives for timber, firewood and other forest products is becoming vital in Pakistan to reduce pressure on forest and rangeland resources but the current number and quantities of alternatives in use is limited. This is likely to increase gradually but conscious efforts and support may promote their use manifoldly and quickly
- Issues external to the forestry sector are important but are complex and require enhanced attention of forest policy makers, planners and managers in Pakistan; discussions have started and inter-sectoral interaction is expected to grow in the future

Follow up to the Outlook Study

This paper will be used extensively in all areas of policy and strategic planning including development of Pakistan Forestry Vision 2030, review and formulation of national, provincial and other sectoral policies, and legal and institutional frameworks. This paper will also help in prioritization for investment planning through development and implementation of programmes and projects.

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