



FOREST TYPES

The following forest types are found in Pakistan.

Littoral and Swamp forests: These are more or less gregarious forests of low height which occur in the Arabian sea around the coast of Karachi and Pasni in Balochistan. The main species is *Avicennia marina* (99%). Other species like *Rhizophora* have disappeared over a period of time due to heavy cutting. According to latest estimates, these forest cover an area of 207,000 ha.

Tropical dry deciduous forests: These are forests of low or moderate height consisting almost entirely of deciduous species. Their canopy is typically light though it may appear fairly dense and complete during the short rainy season. This type does not occur extensively in Pakistan but there are limited areas in the Rawalpindi foothills carrying this vegetation type, all much adversely affected by close proximity to habitation or cultivation. It is closely similar both in floristic composition and in structure to that developed freely in the adjoining parts of North West India. The chief tree species are *Lannea* (Kamlai, Kembal) *Bombax ceiba* (Semal), *Sterculia*, *Flacourtia* (Kakoh, Kangu), *Mallotus* (Kamila, Raiuni) and *Acacia catechu* (Kath). Common shrubs are *Adhatoda* (Bankar, Basuti, Bansha), *Gymnosporia* (Putaki) and *Indigofera* (Kathi, Kainthi).

Tropical thorn forests: These are low, open and pronouncedly xerophytic forests in which thorny leguminous species predominate. This type occupies the whole of the Indus plain except the driest parts. The major tree species are *Prosopis cineraria* (Jhand), *Capparis decidua* (Karir, Karil), *Zizyphus mauritiana* (Ber), *Tamarix aphylla* (Farash) and *Salvadora oleoides* (Pilu, wan). Among them are a large number of shrubs of all sizes. The tree forest climax is very frequently degraded to a very open, low thorny scrub of *Euphorbia* (Thor), *Zizyphus* (Ber), etc. owing to the universally heavy incidence of grazing and other biotic factors. Edaphic variants, especially connected with degree of salinity, shallowness over rock, etc., often occur. A characteristic pioneer vegetation is developed on inland sand dunes and the semi-deserts of the areas of least rainfall.

On the basis of climax vegetation, the whole Indus basin plain with the exception of parts of the districts of Sialkot, Gujrat and Jehlum, consists of tropical thorn forests. Prior to development of irrigation, agriculture and urbanization, the area extended from the foothills of the Himalayas and low-hills in the south-west Punjab plains and Balochistan to the Arabian sea. The climax species of these forests are *Salvadora oleoides*, *Capparis decidua*, *Tamarix aphylla* and *Prosopis cineraria*, which grow on a wide range of soil textures, from flat deep alluvial soils to heavy clays, loams and sandy loams. The climate varies from semi-arid (250 to 750 mm rainfall) to arid (less than 250 mm rainfall). The summer temperature in this tract is as high as 50°C.

Earlier, these forests merged with riverain forests along the river banks and with scrub forests in the low hills in the north and north-western regions of Pakistan. Together these forests provided an ideal habitat to the wildlife of the area which seasonally migrated according to their needs; during cold winter from the lower hills towards the plains in search of food and shelter, from the flood plains towards the dry areas during floods and towards the rivers during the summer drought. This is no longer the situation. Riverain forests now grow in the forms of disjunct patches over an area of 173,000 ha. Irrigated agriculture is carried over 18.668 million ha. and irrigated tree plantations over an area of 103,000 ha in this tract.

Sub-tropical broad-leaved evergreen forests: These are xerophytic forests of thorny and small-leaved evergreen species. This type occurs on the foothills and lower slopes of the Himalayas, the Salt Range, Kalachitta and the Sulaiman Range. The typical species are; *Olea cuspidata* (Kau) and *Acacia modesta* (Phulai), the two species occurring mixed or pure, and the shrub *Dodonaea* (Sanatta) which is particularly abundant in the most degraded areas. Total area of these forests is estimated to be 1,191,000 ha.

Sub-tropical pine forests: These are open inflammable pine forests sometimes with, but often without, a dry evergreen shrub layer and little or no underwood. This type consists of Chir pine (*Pinus roxburghii*) forests found between 900 m and 1700 m elevation in the Western Himalayas within the range of the south-west summer monsoon. It is the only pine of these forests though there is a small overlap with *Pinus wallichiana* (Kail, Biar) at the upper limit.

Himalayan moist temperate forests: The evergreen forests of conifers, locally with some admixture of oak and deciduous broad-leaved trees fall in this category. Their undergrowth is rarely dense, and consists of both evergreen and deciduous species. These forests occur between 1500 m and 3000 m elevation in the Western Himalayas except where the rainfall falls below about 1000 mm in the inner ranges, especially in the extreme north-west.

These forests are divided into a lower and an upper zone, in each of which definite species of conifers and/or oaks dominate. In the lower zone, *Cedrus deodara* (Deodar, diar), *Pinus wallichiana*, *Picea smithiana* and *Abies pindrow* (Partal) are the main conifer species in order of increasing altitude, with *Quercus incana* (rin, rinj) at lower altitudes and *Q. dilatata* above 2130 m. In the upper zone *Abies pindrow* and *Q. semecarpifolia* are the dominant tree species. There may be pockets of deciduous broad-leaved trees, mainly edaphically conditioned, in both the zones. Alder (*Alnus* species) colonizes new gravels and sometimes kail does the same. Degradation forms take the shape of scrub growth and in the higher reaches, parklands and pastures are subjected to heavy grazing.

Himalayan dry temperate forests: These are open evergreen forest with open scrub undergrowth. Both coniferous and broad-leaved species are present. This type occurs on the inner ranges throughout their length and are mainly represented in the north-west. Dry zone deodar, *Pinus gerardiana* (Chalghoza) and/or *Quercus ilex* are the main species. Higher up, blue pine communities occur and in the driest inner tracts, forests of blue pine, *Juniperus macropoda* (Abhal, Shupa, Shur) and some *Picea smithiana* (e.g. in Gilgit) are found locally.

Sub-alpine forests: Evergreen conifers and mainly evergreen broad-leaved trees occur in relatively low open canopy, usually with a deciduous shrubby undergrowth of *Viburnum* (Guch), *Salix* (Willow, Bed), etc. The type occurs throughout the Himalayas from about 3,350 m to the timber limit. *Abies spectabilis* and *Betula utilis* (Birch, Bhuj) are the typical tree species. High level blue pine may occur on landslips and as a secondary sere on burnt areas or abandoned clearings. Rhododendrons (Bras, Chahan) occur in the understory but do not form extensive communities as they do in the central and eastern Himalaya. Dwarf junipers are often abundant.

Alpine scrub: Under this type are included shrub formations 1 m to 2 m high extending 150 m or more above the sub-alpine forests. The characteristic genera are *Salix*, *Lonicera* (Phut), *Berberis* (Sumbul, Sumblue), Cotoneaster with *Juniperus* and occasionally *Rhododendron* or *Ephedra* (Asmania).

Present situation: Forest area of Pakistan reported in different official documents has varied over the years with administrative and political changes in country as well as with changes in methods of reporting data. Different government departments have been publishing different forest statistics since 1947 when Pakistan was created as an independent country. Most recently, data of land use including forest area have been reported by Forestry Sector Master Plan (FSMP) Project in 1993, with the help of Landsat Satellite Thematic Mapper Images at a scale of 1:250,000 covering the whole of Pakistan. This is presented in Table 1.

The total area of forests in Pakistan according to the following table is 4.224 million ha which is 4.8% of the total land area. However, it may be mentioned here that the farmland trees and linear planting along roadsides, canalsides and railway sides covering an estimated area of 466,000 ha and 16,000 ha respectively do not constitute forests within the context of legal, ecological or silvicultural/management definition of forests. The situation is also similar, but to a lesser extent, in the case of miscellaneous plantations over an area of 155,000 ha. If the area of these three categories of plantations is excluded from total forest area of 4.224 million ha, then the latter is reduced to 3.587 million ha which is approximately 4.1 % of the total area.

Table 1 - Forestry Sector Master Plan (FSMP) Estimates of Land Use Based on Satellite Imagery Interpretation (000 ha)

Forest Cover/Land Use Class	Ajk	Balochistanm	Northern Areas	Nwfp	Punjab	Sindh	Total	
							Area	%
Forest/trees								
Conifer	16	42	660	940	30		1,913	
Scrub	1	504		539	132		1,191	
Riverain		20		13	27	112	173	
Mangrove		2				205	207	
Irrig. Plantation	7	1			79	23	103	
Farmland trees		23	6	70	306	54	466	
Linear planting	10			2	14		16	
Misc. Planting	241			120	20	5	155	
Total	275	592	666	1,684	608	399	4,224	4.8
Agricultural								
Irrigated	6	1,177	44	993	10,743	5,705	18,668	
Rainfed	36	3	4	553	1,316		1,912	
Total	42	1,180	48	1,546	12,059	5,705	20,580	23.4
Rangelands								
Degraded	731	11,674	896	4,106	4,466	2,809	24,682	
Non-degraded		892		519	1,293	68	2,772	
Alpine	79		705	269			1,053	
Total	810	12,566	1,601	4,894	5,759	2,877	28,507	32.4
Barren land								
Snow/glacier			27				27	
Rock, gravel		17,516		138	337	523	18,514	
Desertic		2,802			1,324	3,759	7,885	
Tidal flats		54				413	467	
Total		20,372	27	138	1,661	4,695	26,893	30.6
Water bodies								
Riverbed				48	400	155	603	
Lake		5	1	1	1	41	49	
Dam, reservoir	19	1		15	49	54	138	
Swamp					27	96	123	
Total	19	6	1	64	477	346	913	1.0
Urban								
		3		4	62	69	138	0.2
Unclassified								
Above 3,650 m	184		3161	1792			5137	
Below 3,650 m			1536	52			1588	
Total	184		4697	1844			6725	7.6
All Land Classes	1,330	34,719	7,040	10,174	20,626	14,091	87,980	100.0

(Source: FSMP data base); % 'ges by editor.

On the basis of forest area given in Table 1, the percentage forest cover for each province/territory is as under.

Province/territory	Percent geographic area covered by forest	Percent of total forest area
Azad Jammu and Kashmir	20.7	6.5
Balochistan	1.7	14.0
Northern Areas	9.5	15.7
N.W.F.P.	16.6	40.0
Punjab	2.9	14.4
Sindh	2.8	9.4

All the forested area in the country does not have dense tree cover. The FSMP Project gives the following estimates of density of forest/tree area from interpretation of satellite imagery for coniferous forests (coniferous/scrub for Northern Areas), scrub forests, riverain forests, for Azad Jammu and Kashmir (AJK), Balochistan and NWFP (and not Punjab and Sindh), mangrove forests and irrigated plantations. Government records for riverain net forest areas in the Punjab and Sindh were also used by the FSMP.

Table 2 - FSMP Estimates of Forest Cover/Tree Area '000 ha

Forest Cover/Land Use Class	Ajk	Balochistan	Northern Areas	Nwfp	Punjab	Sindh	Total	
							Area	%
Forest/Trees^{1/}								
Dense	17		46	75			138	
Sparse	224	42	614	865	30		1,775	
Sub-Total	241	42	660	940	30		1,913	45.3
Scrub Forests	16	504		539	132		1,191	28.2
Riverain Forests								
Dense	1			2	27	85	115	
Spare		20		11		27	58	
Sub-Total	1	20		13	27	112	173	4.1
Mangrove Forests								
Medium		2				85	87	
Sparse						120	120	
Sub-Total		2				205	207	4.9
Irrig. Plantations								
Dense					48	7	55	
Sparse		1			31	16	48	
Sub-Total		1			79	23	103	2.4
Farmland Trees	7	23	6	70	306	54	466	11.0