



# FORESTS AND FORESTRY I. IN PERSIA

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## FORESTS AND FORESTRY

### i. IN PERSIA

Less than 2 percent of Persia is covered by forests, while another 8 to 9 percent may be regarded as depleted former forest areas. Thus, altogether 150-160,000 km<sup>2</sup> are, or have been, densely forested areas (FIGURE 1).

From a botanical and ecological perspective, Persia's forest vegetation is not uniform. On the contrary, in line with the country's ecological differentiation, Hans Bobek (1951) defines four different types of natural forests and forest-like brushwood: 1) humid forests, 2) semi-humid/semi-arid forests, 3) steppes and deserts with loose stands and brushwood, and 4) riparian forests/coastal forests. Other less differentiating surveys distinguish three different forest formations, covering an area of approximately 180,000 km<sup>2</sup>: "formations xériques," "formations subxériques," and "formations subhumides et humides" (Djazirei). Again, others such as Henri Pabot, favoring regional as well as overall ecological approaches to vegetation formations, speak simply of Caspian or Zagrosian forests or, even more broadly, of types of "steppe-forest areas." Viewed in terms of the economy and ecology, only the humid and semi-humid/semi-arid forests may be termed genuine forest areas.

(1) *Humid forests* are almost exclusively concentrated on the southern fringes



of the Caspian Sea and the rain-fed northern slopes of the Alborz range. Characterized by what were once extremely dense stands of trees with thick and almost impenetrable undergrowth and a great variety of species, the humid forests of the Caspian littoral are subdivided into two distinct subtypes: the so-called Hyrcanian forest and, approximately 1000 m above sea-level, the humid montane forest.

The Hyrcanian forest, which once stretched from Ғәләš in the west through Gīlān and Māzandarān into the western parts of Gorgān, covering the Caspian lowlands as well as the lower parts of the northern Alborz slopes, shares many formal similarities with genuine tropical forests: a several-storied growth structure, a great capacity for regeneration, dense undergrowth with liana vegetation, and a large variety of different plant species. Approximately fifty tree and sixty shrub species have been identified. This forest, partly a relic of the much more extensive warm temperate forests of the past, stretching from southern and central Europe to parts of northern Asia in late Tertiary times, contains a number of endemic species of flora and fauna that are now seriously endangered or have already become extinct. The Hyrcanian forest, which until the late 19th and early 20th century was in large stretches an unspoiled tropical-subtropical environment, has besides a great number of evergreens like *Buxus sempervirens* (Eng. box-tree, Per. *šemsād*); *Prunus laurocerasus* (Eng. cherry-laurel, Per. *jal*), *Ruscus hyrcanus* (Eng. box-holly, Per. *kūle kās* [? *Ruscus aculeatus*]), and *Ilex aquifolium* (Eng. holly, Per., *rāj*), a number of endemic species such as *Quercus castanaefolia* (see BALŪṬ, no. 4); *Parrotia persica* (Eng. Persian parrotia or ironwood, Per. *anjīlī*, *āsūn-dār*, Gil. *tūṭ*), *Pterocarya fraxinifolia* (Eng. wingnut, Per. *larg*), *Albizzia julibrissin* (Eng. silk-tree, Per. *šab kōsb*, *derakt-e abrišam*), and *Gleditschia caspica* (Eng. Caspian honey-locust, Per. *lālakī*) Many of these species are, however, greatly endangered because of over-cutting and/or selective exploitation.

With falling levels of rainfall and temperature, the Hyrcanian forests proper (which used to appear at their most typical in the Caspian lowlands) have been replaced from 800 to 1000 m above sea-level by the humid montane forests.

The humid montane forests, covering not only the high reaches of the northern slopes of the Alborz, but also parts of the Colchian forest regions in the west as well as certain areas of the Qarābāḡ and Qarādāḡ mountains in northwestern Persia, fall into two distinct sections. Following Pabot, they may be termed the medium forest belt (800 to 2000 m) and the upper forest belt, or “sub-alpine belt” (2000 to 2700 m).



Reacting to the maximum rainfall, which is concentrated in the medium forest belt, humidity-loving beech forests (*Fagus orientalis*; see BEECH) in combination with *Carpinus betulus* (Eng. hornbeam, Per. *mamraz*) dominate, but are intermingled with maple species (*Acer insigne*, *A. laetum*; see AFRĀ); elm trees (*Ulmus glabra*; (Per. *nārvan*; see ELM) and other broad-leaved species. The upper forest belt, somewhat drier and colder, especially in winter, than the lower forest belts, is dominated by what were once large stands of oak trees (*Quercus macranthera*) in combination with woody flora components such as *Acer*, *Crataegus* (Per. *dāldālak*, *rīš-valak*), *Prunus*, and *Juniperus* (Per. *sarv*) species.

Despite considerable exploitation in different forms, northern Persia and especially its Caspian slopes, are still the most densely forested areas of the country. While the Caspian lowlands have been turned almost completely into agricultural lands, the foothills of the Alborz, its slopes, and most of its northward-oriented valleys still have considerable forest cover which, however, is undergoing rapid change.

(2) In contrast to the humid forests of the Alborz and its Caspian foreland, the semi-humid/semi-arid forests which are the second most important forest formations, are located in western Persia. They stretch from the present Perso-Turkish border through Kurdistan and Lorestān into the province of Fārs, and their semi-humid oak forests characterize large sections of the Zagros mountain system (Zagrosian forests). Though not smaller in their coverage than the humid forest belt of northern Persia, the semi-humid/semi-arid forests of western and southwestern Persia are characterized by much sparser tree stands and by a comparatively light tree cover with equally light undergrowth. The number of *Quercus* is impressive (*Quercus Brantii*, *Qu. libanii* or *Qu. Boissieri*), but the trees are comparatively short and isolated, with grass and herbs as undergrowth, so that the predominant character is that of a forest-steppe. Besides oaks, other species such as elms, maples, wild almonds, walnuts and pistachios also contribute to the overall light forest cover.

Isolated stands of this Zagrosian forest type appear as outposts on different locations of the Persian plateau, indicating a historically wider expansion of these forests into Azarbaijan and stretching possibly as far as Khorasan. According to Pabot, all areas with an annual precipitation of more than 400 mm. may have once been covered by this specific forest type.



Less protected than the Caspian forests, which were hardly accessible until the late 19th century, the Zagrosian forests have always been within easy reach of farmers, nomads, traders, and armies crossing the Zagros mountains on their way between Mesopotamia and central Persia. Archaeological evidence shows that these forests have been exploited economically for millennia. Human interference, in combination with climatic and other ecological factors (soils, topography), must therefore be considered as decisive for the distinctly different character of this forest type.

(3) In line with Bobek's classification, the steppe and desert regions of Persia are the domain of very specific forest-types. Characterized by extremely patchy distribution and incoherent species composition (due to variations in the availability and the quality of water), Bobek's "loose stands and brushwood" seem to correspond to Djazirei's "formations xériques" or Pabot's forest elements of the Baluchi flora zone in the context of his "xerophilous forest flora" as part of the Irano-Turanian flora zone. Although largely destroyed by human interference, the remnants of these formerly widespread "dry" forests can still be subdivided into two sub-types: a) *Juniperus* forests and b) pistachio-almond-maple forests.

*Juniperus* forests with *J. polycarpus* as the dominant species belong to the cold-resistant type and thus are mainly to be found in the northern parts of the country. Originally covering large stretches of the southern slopes of the Alborz as well as large tracts of the Khorasan mountain systems, *Juniperus* forests seem to thrive best at the same heights as the Caspian montane forests but under distinctly drier conditions. Aridity is also the reason for the comparatively thin stands of these forests as well as for their light, steppe-like, and mostly herbaceous undergrowth. Stretching into the neighboring regions of Armenia and Anatolia in the west and into Afghanistan in the east, *Juniperus* intermingle with other trees or woody shrubs such as pistachios, almonds, barberries (Per. *zerešk*), and cotoneaster (*širkešt*) species in drier environments; and with walnuts, willows, tamarisks and others in more damp habitats, especially in riverine areas or close to ground water reserves.

Pistachio-almond-maple forests are the more arid component of this third forest-type. Originally the continuation of the semi-humid/semi-arid forests of the Zagros towards the east and the interior, loose stands of pistachio-almond-maple have more or less disappeared from around big urban centers such as Tehran or Isfahan. Certain parts of Fārs (e.g., around Lake Nīrīz) or Kermān and their mountains are still covered by these very light forests, growing on



steppe-like ground- covers over lithosols, or soils of chestnuts or sierozem type. Pistachios (*P. atlantica*) sometimes intermingled with almonds, maples or junipers are on the whole, however, characterized by their low and light stands, resembling very often scanty bush lands rather than forests.

(4) A very specific type of Persian “forest” consists of completely azonal stands of trees, bushes or woody shrubs. Usually covering small areas and always dependent on very specific local conditions, they appear, for example, around waterholes in very arid deserts. While it is hardly justified to label them as “forests” in the proper sense of the word, one type of these azonal “forests” is composed of isolated stands of saxaul (*Haloxylon sp.*; Per. *tāḡ*), occurring in areas where ground water can be tapped by their deep roots. Another type are riparian and wadi forests along the few perennial or periodical rivers and subterranean streams close to the surface. These ecologically favored locations exhibit a wide variety of different species (tamarisks, willows, poplars, wild fruit-trees, elm, plane) combinations being dependent on the availability of water, on climatic conditions and the variety of soil. A third type of azonal “forests” are more or less isolated distributions of tamarisks, saxaul, and halophytic ligneous bushes in extremely salty environments, for instance along the shores of salt lakes or at the edge of *kavīrs*.

Small occurrences of mangrove forests (*Avicennia officinalis*) are typical for the Straits of Hurmuz and other smaller segments of the Persian Gulf coast.

Except for northern Persia and part of the Zagros, one can therefore hardly speak of “forests” in the Persian context. While undoubtedly from an ecological perspective tree-cover could be much more extended, human interference has since Neolithic times greatly diminished the distribution and composition of forests in Persia (Figure 1).

*Deforestation and its causes.* Present-day Persia has hardly any virgin forests left: deforestation as a result of the millennia-old human impact on the natural environment—population growth, appropriation of land for agriculture, exploitation of forests by nomads, and increasing demand for wood as construction material or as firewood (charcoal)—have destroyed or depleted the forest resources of the country. It is difficult to reconstruct the original distribution and composition of the Persian forest ecosystems. It is equally difficult to identify primary and secondary causes of their destruction and to attribute these causes to specific periods of history. As already indicated, the present poor state of forestry in Persia cannot be attributed to a single cause.



Bobek (1951, 1958) and Xavier de Planhol are, to date, the only scholars who have tried to reconstruct the history of deforestation in Persia, de Planhol's article of 1969 being the first attempt at a comprehensive analysis. According to him (p. 625) and partly based on Bobek, the situation around 1960/1965 can be summarized as follows: approximately 95 percent of the *Juniperus* forests in the arid Alborz sections and in Khorasan had been destroyed, as well as almost 100 percent of the pistachio-almond forests of central Persia. Only the Caspian forest region retained part of its original status. According to Bobek's estimates around 1950-55, 25 percent of the Caspian lowland proper were still covered by heavily degraded humid forests, while the foothills and slopes of the Alborz and its valleys were 25 percent comparatively intact, 25 percent strongly degraded and the remaining half of the original forest completely destroyed (quoted from de Planhol, p. 625). While there is no doubt that from an ecological point of view even potentially intact ecosystems are damaged as a result of the degradation of their adjacent areas, it is clear that nowadays there are hardly any virgin forest areas left in Persia. Even those sections of the Caspian forest belt that still seem to be abundant in vegetation cover have experienced selective exploitation through forestry, forest pasture, and various forms of individual tree cutting for charcoal, building material, and similar uses.

The history of deforestation requires a differentiated approach in regard to space (Caspian versus Zagrosian forest) and time. The deforestation of the Zagrosian forests and that of other arid sections of Central Persia are as old as human settlement there, although with differing intensity in different periods. De Planhol (pp. 626-32) argues that during Greek-Hellenistic times ancient records speak of densely forested areas not only in the Zagros and its forelands, but even in the more arid parts of present-day Fārs. In central Persia, on the other hand, deforestation seems to have been more advanced (de Planhol, p. 627). Evidence of both Roman intervention and Sasanian adaptation of Roman lifestyles and engineering techniques tend to support de Planhol's conclusion (p. 629), according to which deforestation had progressed greatly between the Achaemenid period and the Middle Ages. On the other hand, the medieval period, with the "nomadization" of large parts of the population due to the impact of the Mongol conquests and destruction of cities and rural settlements, coincided with an "équilibre forestier" in which nomads used the forests solely for their own needs and that of their flocks. This ensured a kind of sustainable preservation of the degraded forests to the extent that, until the early 20th century, further deterioration of the semi-



humid/semi-arid Zagrosian forests was halted. It was not until the post-World War II period that the intricate balance and interdependence of land-use and land cover were destroyed by the expansion of agricultural land, firewood collection, and forest-pastoralism, producing the devastating effects summarized by Bobek (1968, pp. 281-82) as follows: “Two of the most devastating human activities have been fuel collecting and charcoal-making, vital though these may be in a country with low winter temperatures. Together with extensive cutting of timber for building, these activities have not only greatly reduced the forest areas (which were restricted to begin with), but have also degraded the character of woodland. In addition, the steppes and even the desert areas have also been deprived of their woody component; other fundamental changes in the composition of the steppes have been effected by continual animal grazing. This had led ultimately to the disappearance of the perennial grasses and to their replacement by non-palatable weeds or spiny shrubs. Finally, man’s collection of edible herbs, bulbs, and roots for food and medical purposes is by no means negligible, and contributes to the same ultimate effects: that is, extreme impoverishment.”

Essentially the same mechanisms (see [ECOLOGY](#), fig. 2), but condensed in terms of space and time, became instrumental in the destruction of the Caspian-Hyrcanian forests. Given its remoteness and inaccessibility, as well as its entirely different botanical composition and appearance and, finally, due to the problems created by the humid climate, the Caspian forest belt remained more or less untouched until the end of the 19th and the beginning of the 20th century. The dense forest-cover in combination with a supposedly extremely unhealthy climate, with malaria being endemic, made many Persians regard the Caspian forests as the incarnation of a hostile nature. European travelers of the 19th and early 20th centuries describe the Caspian lowlands and even its urban centers as heavily forested and covered with jungle. The following is a typical description, “Of the present extent of population of Babol, it is hard to form any estimate. I never saw a place of which it was so difficult to acquire an idea from ocular observation. The whole town being built in and surrounded by a forest of high trees..., there is no one spot from whence a spectator can see to any distance...” (Fraser, pp. 83-84). At the end of the 19th century, Curzon (*Persian Question*, p. 382) described Āmol as follows: “The town is so overgrown with jungle and orchards as to be collectively invisible.”

British silk merchants in the late 18th century, attracted by the prospects of developing large mulberry plantations (which never materialized), were the



first to have an impact, even though a very limited one, on the thick and almost impenetrable Caspian forests. More important was imperial Russia's interest in the Caspian forests in connection with the Russian advance into Central Asia and its steppe regions in the mid-19th century. Charcoal produced on the southern coast of the Caspian Sea became a major export, shipped across the Caspian Sea from Astarābād, Rūdsar, Anzalī, and Langarūd to Baku and other Russian ports. The most decisive attack on the Caspian forests, however, came with the construction of all-weather-roads across the Alborz from 1920 onwards. The period from 1918 to 1950 can be regarded as the most decisive phase of uncoordinated deforestation. The rapid expansion of Tehran created huge demands for charcoal and timber for construction leading to rapid depletion of the easily accessible tracts of the Caspian forest belt. Only in 1958 was the production of charcoal officially forbidden. The nationalization of all forests after 1960 was another major step in the preservation of the remaining forests (see [DERAḲṬ](#); [ENVIRONMENTAL PROTECTION](#)).

In other parts of Persia, forests and stands of forest-like vegetation have undergone such a drastic decline that desertification is taking place even in those parts of Central Persia where—in remote and ecologically favorable areas—small reserves of trees, woody bushes, and shrubs had hitherto survived. The use of wood as fuel is the decisive factor in the destruction of the last of the “forests” in Central Persia.

*Forestry and forest industries today.* In view of the scattered distribution and depleted nature of forests within Persia, and given the lack of a scientifically based and sustainable forestry, forest industries are very limited and are significant in only a few regions. A recent statistical survey (*Iran Yearbook '93*, pp. 346-47) lists 182 large wood industry plants, 37 of which employ between 50 and 999 workers, while only 3 employ more than a thousand workers. The fact that the labor force in this sector is less than 14,000 indicates the small size of the industry. All major sawmills as well as wood and paper industries are located in Gīlān or in Māzandarān. The center of economic forestry in Gīlān is the Haštpar region and the hinterland of Rašht. A large new wood and paper processing unit has apparently been set up near Sārī with a capacity of over 240,000 tons of paper. At the time this article was being written, it was not possible to verify whether the project to build a second newspaper roll manufacturing mill in Māzandarān (by the Austrian Voith company) had been realized.

See also [ĀZĀD](#), [BĪD](#), [ĀENĀR](#), FLORA.



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