

Economic Importance of Tree Species

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PREFACE

Trees are important to humans not only economically, industrially, environmentally but also spiritually, historically and aesthetically, for they sustain human life through numerable tangible and intangible benefits. But it is not always easy to define a “tree.”

A tree is a large, long-lived (i.e., perennial) woody plant that attains a height of at least 6 m (20 ft) at maturity in a given locality and usually—but not always—has a single main self-supporting stem called a “trunk” or a “bole,” which gives off spreading branches, twigs and foliage to make a crown (Venkatesh, 1976; Panshin & de Zeeuw, 1980; Hawkins, 1986).

Trees can be classified in several ways: Depending upon their utility or end products, they may be called “avenue,” “ornamental,” “shade bearing,” “fragrant,” “fruit bearing,” “medicinal” or “drug yielding,” “timber yielding,” “fodder yielding,” “nitrogen fixing,” “venerated,” “fuel yielding,” “fibre yielding,” “multipurpose trees,” etc.

Because trees meet many human requirements, planting of trees is a good exercise in meeting its needs and also serving purposes of afforestation and restoration.

This ebook is a result of the culmination of a life long fascination with trees. The contents will be continuously updated in future. If you have purchased this ebook, you are entitled to free updates for life. Please register with your working email ID’s for receiving latest information.

-Authors

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Family: Fabaceae

Genus: *Acacia*

Species: *A. Auriculiformis*

Common name: Australian wattle

Origin: Australia

Description: Moderate sized ,evergreen tree, bark smooth, leaf stalks are modified into flattened blade called phyllode, which is narrowly oblong, slightly curved or sickle shaped, flower tiny, yellow, fragrant, crowded in axillary spikes. Pods are wide, flat, hard almost woody and much twisted in irregular coils. Initially green but turn brown on ripening.



Picture 1: Flowers of *A. auriculiformis*

Economic Importance:

- The primary use of the species is for fuel wood. Except this, the species does not have much economic value. The use of species for fuel is favoured because of the high calorific value being 4800 to 4900 kcal/kg. It also gives excellent charcoal that glows well and burns without smoke and sparks.
- The wood is used for making pulp. The pulp has high strength properties and is used in the pulp and paper industry.
- Timber is used for local furniture but only locally and not on a large scale.
- 13% of water soluble tannin is present in the bark which produces good quality leather.
- Because of its ability to survive inhospitable sites, it is much used in reclaiming wasteland areas, in conserving soil and water.
- Leaves may be utilised for the production of biogas as they are easily degradable.

ECONOMIC IMPORTANCE OF ACER OBLONGUM

Family: Sapindaceae

Genus: *Acer*

Species: *A. oblongum*

Common name: Himalayan maple, mangoi

Origin: India

Description: A middle sized tree, leaves oblong or ovate-lanceolate. Flowers pentamerous terminal or leaf bearing lateral corymbose, panicles pedicel and calyx hairy .



Picture 2: Seeds of *A. oblongum*

Economic Importance:

- Fine texture wood which is soft and moderate. Used for minor construction purposes, and for making plywood, boxes and planks.
- Sometimes also used for making ladles, drinking cups and agricultural implements.
- Suitable for making commercial and moisture proof plywood, gun and rifle parts, and furniture.
- The timber is durable under cover but not when left in the open.

ECONOMIC IMPORTANCE OF *ADENANTHERA MICROSPERMA*

Family: Fabaceae

Genus: *Adenanthera*

Species: *Adenanthera microsperma*

Common name: Black bean, moreton-bay chestnut

Origin: Indonesia (Java)

Description: A medium- to large-size deciduous tree. The tree is generally erect, having dark brown to greyish bark, and a spreading crown. Multiple stems are common, as are slightly buttressed trunks in older trees. The leaves are bipinnate. The alternate leaflets, are oval-oblong with an asymmetric base and a blunt apex. The leaves yellow with age. Flowers are borne in narrow spike-like racemes, at branch ends. They are small, creamy-yellow in colour, and fragrant. The leathery pods curve and twist upon dehiscence.



Picture 3: Tree - *Adenanthera microsperma*

Economic Importance:

- Wood is insect resistant and decay resistant. It is therefore used for house- building, use in furniture, bridges etc.
- The seeds are attractive and are used for ornamental purposes such as for making beads in jewellery and rosaries. They were also used in ancient India for weighing gold. The seeds are curiously similar in weight. Four seeds make up about one gramme. In fact the name "saga" is traced to the Arabic term for "goldsmith". In India, it is believed that a person may have as many wishes as elephants found in a saga seed.
- The ground seeds can produce an oil which was used as an industrial lubricant.
- Wood is also employed for making cabinets. Also used as firewood because it burns well. Red dye is obtained from the wood.
- Trees are also planted for shade in coffee plantations.

Common name: Bel

Family: Rutaceae

Origin: India

Description: The leaves are compound, trifoliate and with a peculiar fragrance. The leaflets are oval or lancet shaped. The lateral leaflets are without petiole and the terminal one has a long one. The flowers are greenish white and fragrant. The fruit is both edible and medicinal. It is spherical or oval. The seeds are small, hard. Multiple seeds are covered in a viscid material in the pulp.



Picture 4: Tree-*Aegle marmelos*

Economic Importance:

- The Unripe fruits are astringent, digestive and are useful in providing relief in diarrhoea and dysentery.
- The pulp is aromatic and cooling and is frequently used for making a cooling drink-sherbet.
- The gum like substance around seeds serves as an adhesive. It is also used as a varnish for pictures and adds brilliancy to water- colour paints.
- Pill boxes are made after emptying the fruits.
- Gum is obtained from the stem.
- Essential oil is obtained from leaves.

Common name: Australian dammar pine, kauri pine

Family: Araucariaceae

Origin: Australia

Description: Monoecious tree, trunk clear for over half its length; crown dense. Bark is orange-brown, brown or grey-brown; smooth to slightly flaky. Bark exudates a clear or somewhat milky. Leaves spirally arranged on primary shoots, opposite to sub-opposite on lateral shoots; leaves entire on petioles, linear to elliptic, veins fine, longitudinal, more or less parallel. Juvenile leaves similar but oblong-lanceolate, acute, glabrous, green, shiny above and dull beneath, venation faint and longitudinal.



Picture 5: Tree-*Agathis robusta*

Economic Importance:

- Excellent source of timber for general joinery purposes.
- Wood is easy to work upon and gives a glossy surface. Used for making plywood, cabinet works, furniture, indoor fittings and building boats.
- Wood is also used for manufacture of writing, printing, and wrapping papers.
- Yields an oleoresin which is used in adhesives, paints, polishes, inks, and lacquers.

Common name: Satwin, chattin

Family: Apocynaceae

Origin: India

Description: It is a medium sized to a large evergreen tree with tall, straight often buttressed and fluted stem. Whorled branches and dark – grey shining leaves also in whorls. Bark is blackish grey, rough with shallow cracks. Leaves 4-10 in a whorl, obovate & obtuse, gradually narrowed into the petiole, dark green above, pale beneath. Flowers greenish white, in panicles of cymes on stout peduncles. Follicular fruit.



Picture 6: Flower of *Alstonia scholaris*

Economic Importance:

- The wood is used for manufacturing packing cases and boxes for packing tea, writing boards and lamina boards. Wood charcoal is used for gun powder.
- Can be peeled easily and accepted as suitable for 3rd class commercial plywood after necessary treatment.
- It is good enough for making both match boxes and splints, also fairly suitable for second grade pencil and paper industry.
- Bark which is bitter in taste is used as an astringent, tonic and useful for diarrhoea and dysentery. The milky juice of bark is applied to sores and ulcers. Bark also yields a fibre.
- Flowers yield an essential oil and the alkaloid picrinine which acts as a depressant.

ECONOMIC IMPORTANCE OF *ANOGEISSUS PENDULA*

Common name: Chakwa

Family: Combretaceae

Origin: India

Description: It is a small tree, Bark is smooth grey, sliver white often with shallow fissures when old. Leaves elliptic, acute and narrow at the base, silky on both surface. Fruit small, one seeded with two wings, and a short beak at the apex.



Picture 7: Tree-*Anogeissus pendula*

Economic Importance:

- The wood has a lot of mechanical strength and very tough. It is regarded as the 3rd toughest timber in the world. The timber is used for furniture, agricultural implements, tool handles of all kinds, poles, rafters, for carts, spokes of wheels, toys, shuttles and bobbins, tool handles etc.
- At present, it is extensively used as fuel wood, calorific value of sap-wood being 4837 kcal and hardwood 4739 kcal/kg.
- The leaves are used as fodder.
- Bark yields a gum called gatti or Indian gum.
- The main value of the tree lies in its afforestation purposes for afforesting the semi-rocky and rocky terrains of arid regions.

Family: Rubiaceae

Genus: *Anthocephalus*

Species: *A. chinensis*

Origin: India

Common name: „Kadam“ in India, Bur flower tree in English

Description: Kadam is a large, tall tree, with a straight cylindrical bole. Foliage consists of elliptic-oblong, shining, opposite, simple leaves. Flowers are small, orange-coloured in dense terminal globose heads. The fruit is a pseudocarp of closely packed capsules each containing minute, singular seeds.



Picture 8: Fruit of *Anthocephalus chinensis*

Economic Importance:

- The wood is moderately strong and can be seasoned easily. The timber when treated is quite durable. It saws readily and works easily under tools.
- Wood is extensively used for ceiling boards, light construction work, packing cases, planking, carving, and turnery. The wood makes good veneers and plywood suitable for the manufacture of Grade 4 commercial plywood and tea- chest plywood. It is also suitable for making both match boxes and splints. Brown wrapping paper can also be made by sulphate process.
- Fruits are edible. Bark and leaves are used for medicinal purposes. It is used as an Ayurvedic medicine for uterine disorders, blood diseases and leprosy.
- Juice prepared from the bark of *Anthocephalus chinensis* is given orally to lower body temperature.

Common name: Candelabra tree
Family: Araucariaceae
Genus: *Araucaria*
Species: *A. angustifolia*
Origin: Brazil

Description: It is an evergreen tree. The leaves are thick, tough and scale like, triangular, and with razor-sharp edges and tip. They persist for 10-15 years, so cover most of the tree except for the trunk and older branches. It is usually dioecious, with the male and female cones on separate trees. The male (pollen) cones are oblong. The female (seed) cones, are globose, and hold about 100-150 seeds. The cones disintegrate at maturity to release the nut-like seeds.



Picture 9: Tree-*Araucaria angustifolia*

Economic Importance:

- The wood is easy to saw and season. In Australia, the wood is used for indoor finishings of houses, furniture, general house fittings, kitchen table, for carving and box wood.
- It is planted mainly for its ornamental appearance. The tree looks majestic and beautiful and is frequently planted in gardens and homes for aesthetic value.
- The seeds are consumed as food in some parts of the world.
- The flower buds have medicinal value.

Common name: Neem
Family: Meliaceae
Genus: *Azadirachta*
Species: *Azadirachta indica*

Description: *Azadirachta indica* is native to India and Pakistan growing in tropical and semi-tropical regions. It is medium to large sized tree with rounded crown of bright green dense foliage. Leaves are imparipinnate, crowded towards the end of branches.



Picture 10: Fruit of *Azadirachta indica*

Economic Importance:

- The wood peels well and is found useful for making shuttering grade plywood. Tree is grown for fuel wood purposes in India and Africa.
- Seeds yield a oil having strong disagreeable garlic like odour and known as “margosa “ oil, heals bleeding gums and cures pyrrhoea when it is used in mouth was and toothpaste. The same compound is also found effective in various skin diseases, burns and scabies. Neem seed cake, a residue after extraction of the oil is valued as a fertilizer and repellent for insects. It contains more sulphur than any other cake.
- *Neem* has emerged as an ideal source of pesticides and insecticides. About 350 species of insect pests, 18 species of nematodes and equal number of fungi have already been found to be susceptible to “*neem* effect”. A real breakthrough was made by Pradhan who first reported the extraordinary antifeedant properties of neem seed kernel against desert locust *Schistocera gregaria*. Later Ketkar, Mitra and Prasad have highlighted the pesticide potential of neem seed extracts due to “azadirachtin”, a biologically active compound. *Neem* . *Neem* extracts have been found to influence the insect activity and behavioural ecology such as feeding deterrent, growth disruptor, repellent, ovipositional deterrent and as insecticide. These extracts are also reported to influence or impair egg production and hatchability in insects.
- *Neem* is also regarded as a good fodder tree and heavily lopped for goats and sometimes for cattle also, the cattle relish only in the absence of other fodders.

Family: Bombacaceae
Genus: *Bombax*
Species: *Bombax ceiba*
Origin: India
Common name: Semul

Description: This tree has a straight tall trunk and its leaves are deciduous in winter. Red flowers with 5 petals appear in the spring before the new foliage. It produces a capsule which, when ripe, contains white fibres like cotton. Its trunk bears spikes to deter attacks by animals.



Picture 11: *Bombax ceiba*

Economic Importance:

- The heartwood is dark-brown, strong, hard easy to polish and work. But it is not a durable timber and is readily attacked by wood borers, white ants and decay. Used mainly for heavy packing cases, agricultural implements, posts, scantlings, rafters and inferior construction, besides it is used for fuel.
- The leaves give a fodder of medium quality. Flowers are cooked as vegetable and pickles. The bark is used as a cheap tan, dye and in indigenous medicine. The tree has ornamental value because of its gorgeous flowers.

Family: Fabaceae

Genus: Bauhinia

Species: *B. purpurea*

Origin: India

Common name: Purple bauhinia, camel's foot tree, khairwal (Angiosperms)



Picture 12: Flowers of *B. purpurea*

Description: Moderate sized evergreen tree. Young parts are covered with brown pubescence. Leaves cordate, nerved, the twin leaflets fold at night. Flowers large, showy, fragrant, rosy purple or lilac, in short peduncled terminal panicles. Seeds oblong, dark-brown, smooth and compressed.

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ECONOMIC IMPORTANCE OF *CANARIUM SPP.*

Family: Burseraceae

Genus: *Canarium*

Species: 1. *C. strictum*
2. *C. bengalense*

Origin: India

Common name: 1. *C. strictum* – Kala dammar
2. *C. bengalense*- East Indian copal

Description: Lofty, evergreen tree. Leaflets elliptic - oblong to lanceolate, crenate-serrate. Flower white. Disc crenate, hairy. Fruit drupaceous elliptic.



Picture 13: Tree- *Canarium spp*

Economic Importance:

- *C. strictum*- yields a resin known as black dammar or Artiba resin, used in the manufacture of varnishes and as a substitute for Burgundy pitch in plasters. Wood has a good glue holding capacity and plywood tea- boxes made from it proved to be amongst the strongest.
- *C. bengalense*- source of a resin which is used as incense. Wood does not warp and can be used for planks, shingles and tea- boxes.

ECONOMIC IMPORTANCE OF CASSIA SPP.

Botanical name;

- *C. fistula*
- *C. javanica*
- *C. nodosa*

Family: Cesalpinioideae

Description: Middle sized to large deciduous tree. Leaves with leaflets in opposite pairs, ovate. Flowers bright yellow, in drooping, long racemes. Pods indehiscent, cylindrical, smooth, pendulous, dark- brownish when ripe.



Picture 14: Flowers of *Cassia* spp.

Economic Importance:

- The wood is very hard and very heavy. The timber is difficult to season, and liable to severe surface seasoning defects. The trees can best be girdled to reduce these defects. The heartwood is highly durable both in open and under cover. It takes a good and lasting polish.
- It yields a durable timber considered to be better than sal and is used everywhere for house posts, bridge posts, agricultural implements, shafts of carts etc. It makes excellent tool furniture, turnery and boat building. It is an excellent fuel wood and yields excellent charcoal.
- The bark is known as *sumari* and is used for tanning in admixture with *Cassia auriculata* bark. The average tannin content of the commercial is 10 to 12 %. It produces smooth grained leather. It makes well with babul bark.
- The pulp of ripe pods is a very strong purgative and is eaten and made into a drink, rich in protein and carbohydrates, given to patients of diabetes and blood poisoning.

Family: Fabaceae

Genus: *Castanospermum*

Species: *C. australe*

Common name: Black bean, moreton-bay chestnut

Origin: Australia

Description: It is a large evergreen tree growing to 40 m tall, though commonly much smaller. The leaves are pinnate, with 11-15 leaflets. The flowers are bicoloured red and yellow, produced in racemes. The fruit is a cylindrical pod, the interior divided by a spongy substance into three to five cells, each of which contains a large chestnut-like seed.



Picture 15: Tree- *C. australe*

Economic Importance:

- Seeds are edible after roasting, rich source of starch.
- Wood used for panelling, furniture, cabinets, and other decorative work. Suitable for switchboards and other electric fittings, exceptionally high insulation. The timber, which somewhat resembles walnut, is soft, fine-grained, and takes a good polish, but is not very durable.
- Castanospermine is reported to have anti- cancer potential. It inhibits platelet aggregation in metastatic H- Ras- transformed fibroblasts, inhibits tyrosinase activity in human melanoma cell and also biosynthesis, maturation and transport of alpha anti-trypsin in human leptoma cell line. Castanospermine is a useful tool in co-relating glycoprotein composition in cell development in mouse cerebellum in probing T-cell function and proliferation and in biosynthesis of vasopressin V₂ receptor in renal epithelial cell.

ECONOMIC IMPORTANCE OF *CEDRUS DEODARA*

Family: Coniferae

Genus: *Cedrus*

Species: *C. deodara*

Common name: Deodar

Description: Tall, evergreen tree dark-green foliage, forming a typical conical crown. Branches two types, long shoots bear spirally arranged leaves, dwarf shoots bear cluster of leaves in pseudowhorls. The dwarf shoots elongate lightly, adding a new whorl of leaves each year. Flowers monoecious, male and female cones occurring on separate branches.



Picture 16: Tree- *C. deodara*

Economic Importance:

- Deodar is widely regarded as one of the strongest woods in India and is as important as Teak. Timber is easy to saw. It is unsuitable for polish or print work as the oil in the wood (especially near the knots) always oozes through when exposed to direct sunlight and discolours the coating.
- It is easy to air-season but shows a little tendency to surface-cracking and end-splitting if dried too quickly, for this reason it should be air-seasoned under cover. It can also be kiln-seasoned easily without degrade. Seasoned heartwood of deodar is very durable and classified as durable class 1. The durability of deodar may be due to the presence of terpenes/resin acids present in the heartwood.
- Used primarily in buildings for beams, door and window frames and shutters and classified under group 1 timbers. Also used for furniture making and cabinet making to a limited extent. The thinning poles of deodar are suitable for overhead power and telecommunication lines. It is also used for making cases and donnage pallets. Also found suitable for manufacture of high class pencils, cooling towers, drawing equipments, jute and textile mill accessories, wooden shingles, railway carriages, model and pattern making, keys of stairs etc.

ECONOMIC IMPORTANCE OF *CINNAMOMUM CAMPHORA*

Family: Lauraceae

Genus: *Cinnamomum*

Species: *Cinnamomum camphora*

Common name: Camphor tree, Kapur, Karpura

Origin: China

Description: Middle sized evergreen tree with yellow brown branches. Leaves sub-coriaceous , ovate or broadly so or elliptic, abruptly acuminate, lustrous above. Flowers bisexual, membranous, linear, soft-pubescent.



Picture 17: Tree- *Cinnamomum camphora*

Economic Importance:

- The wood has a strong scent of camphor. It seasons without difficulty and is workable well under tools. The wood is moderately hard and moderately hard. Used for cheaper grade of furniture, chests, tea-boxes and rafters, scantlings and planking for lighter forms of construction.
- The tree yields camphor which is distilled from leaves and wood and finds uses in pharmaceutical and perfumery industry. The yield of camphor from leaves in India ranges below 2% making it uneconomical for cultivation. Camphor oil of commerce is the oil of *C. camphora* from which the camphor is removed. Camphor is extensively applied in external applications as a counter irritant in muscular strains, inflammations and rheumatic conditions.

ECONOMIC IMPORTANCE OF *CITRUS GRANDIS*

Common name: Pummelo, Chakotra

Family: Rutaceae

Origin: Malaysia

Description: Fruit is usually a pale green to yellow when ripe (but also pink or red), with sweet flesh and thick spongy rind. It is the largest citrus fruit.



Picture 18: Fruit of *Citrus grandis*

Economic Importance:

- The peel is sometimes used to make marmalade, or candied then dipped in chocolate. Also used in Chinese cooking or candied. In general, citrus peel is often used in southern Chinese cuisine for flavouring, especially in sweet soup desserts.
- Fruits are esteemed for deserts, made into jams and considered nutritive and refrigerant.
- Leaves used in epilepsy, chorea, and convulsive coughs.

Botanical name;

C. cashmeriana

C. torulosa

Family: Cupressaceae

Description: It is an evergreen tree with pyramidal shaped crown, ascending branches, pendulous branchlets and fan-shaped foliage with a bluish tinge. Cones greenish yellow. Seeds winged.



Picture 19: Tree- Cupressus spp.

Economic Importance:

- The wood is suitable for the production of Kraft, writing and printing papers and mechanical pulp for newsprint pulp for newsprint grade of paper, at fairly high yield. The tree is cultivated as an ornamental in FRI, Dehradun.
- A very useful tree for avenues and gardens.
- Heartwood is light brown with darker streaks, moderately hard, suitable for making furniture and building material. It is an excellent timber for making railway sleepers. It is considered durable.
- It is one of the most durable coniferous woods requiring no antiseptic treatment. Preferable to deodar wood for making window frames, ceilings, panels of doors, and flooring. Also suitable for pen- holders and inferior grade pencil.
- Leaves yield an essential oil.

Family: Fabaceae

Genus: *Delonix*

Species: *D. regia*

Common name: Gulmohar

Origin: Madagascar

Description: Moderate sized fast growing, deciduous tree and light feathery foliage. Leaves bipinnate, at base of leaflet two stipules occur. Flowers appear in corymbs along and at the ends of branches. Pods are green and flaccid when young and turn dark-brown and woody.



Picture 20: Flowers of *D. regia*

Economic Importance:

- The wood is employed locally for agricultural implements; handles for carpentry tools, combs etc. Principle use is as fuel, the calorific value of wood being 4600 kcal/kg.
- The tree is mainly valued for its seeds , leaves, shade and ornamental value.
- The seeds yield 18 to 27.5 % fatty oil known as the “ pangam” or “karanga” oil of commerce. Its main use is in tanning industry. The oil and its “karjan” possess insecticidal and anti- bacterial properties. The oil also finds use in soap- making, illuminating and pharmaceutical preparations. The oil cake is good fertiliser. The seed cake can also be used in poultry ration to substitute black “til” component of ration.
- The seed is carminative, purifies and enriches the blood and is used in cases of inflammation, “ear ache” and chest complaint.
- The tree is mainly grown for its shade and ornamental value. Because of its hardy nature and aggressive root system, it is a good tree to control soil erosion in the arid and semi- arid areas.
- It is host for lac- insect also.

Family: Dilleniaceae

Genus: *Dillenia*

Species: *D. indica*

Common name: Elephant apple, chalta

Origin: India

Description: Middle sized to evergreen tree. Leaves fascicled at the end of the branches, oblong lanceolate, acuminate, sharply serrate, lateral nerves. Flowers large, white, fragrant. Petals obovate, delicate. Fruit always green, hard and enclosed by five thickened sepals.



Picture 21: Fruit of *D. indica*

Economic Importance:

1. The timber is moderately refractory to seasoning. It is very durable though the sapwood is subject to attack by borers. It takes a good polish but requires initial grain filling.
2. The sapwood is considered valuable now. Poles are used for posts, rafters, shafts and for agricultural implements. Sapwood is the best Indian timber so far tested for textile shuttles. The poles can be used for mine work and pit- props. The ebon heartwood is used for carving, picture frames, scales, toys, combs.
3. The fruit is edible. The fruit, leaves and bark are useful for many cures. Leaves are reported to be lopped for fodder in U.P. Leaves have a great importance in the cottage industry for wrapping bidis, because of its certain special quality such as flavour, colour, leathery texture, easy workability on drying, resistance to decay, good smoking and burning qualities and mainly because of its availability in the larger parts of India.

ECONOMIC IMPORTANCE OF DYSOXYLUM BINECTARIFERUM

Family: Meliaceae

Common name: Lassuni amari

Origin: India

Description: Evergreen tree, leaves with leaflets cuneate at the base, entirely or obscurely dentate along the margins, acuminate at the apex. Flowers shortly pedicellate. Calyx cup-shaped, entirely or obscurely 5-lobed, about half as long as petals. Petals 4, velvety.



Picture 22: Tree- *Dysoxylum binectariferum*

Economic Importance:

- Wood can be sawn and machined well and worked to a smoothed surface. Timber used for building construction, boxes, canoes, and turnery; also suitable for match boxes and splints, cigar- boxes, and ply board.
- These trees are regarded as essential components of the native rainforest of their ecosystems such as the Australian temperate rainforest.
- Wood was widely used in furniture trade.
- Bark contains tannin.

ECONOMIC IMPORTANCE OF *EUCALYPTUS* SPP.

- *E. alba*
- *E. citriodora*
- *E. paniculata*
- *E. resinifera*
- **Family:** Myrtaceae
- **Origin:** Australia

Description: Tall evergreen tree with smooth and greyish bark, bark exfoliates in plates or strips. Leaves alternate, narrowly lanceolate, pale coloured, thin, petiolate with conspicuous venation.



Picture 23: Tree- *Eucalyptus* spp.

Economic Importance:

In the Nilgiris, timber is used for temporary construction, as it splits very badly. It can be used for electric transmission poles after putting iron bends at the top and bottom of the posts. It gives a good fuel wood having calorific value of 4962 kcal/kg. The charcoal maybe used for producer gas plants, in pigments, fireworks, gun-powder, rubber-production, animal feeds, and some other chemical industries.

The wood yields a brownish pulp useful in manufacture of wrapping paper and card-board. White pulp of good quality can be obtained from the wood by sulphite and soda process. Mixed with spruce and other long fibred pulp, blue-gum pulp may be used for producing high grade pulp. High alpha cellulose pulp can be prepared by sulphite process which in turn is prepared into viscose rayon, an important synthetic fibre.

The oil is useful in many pharmaceutical preparations, flavouring of cough lozenges, mouth gargles, tooth-pastes, perfumes, repellents against mosquitoes, vermins, germicides etc.

Botanical name:

1. *F. krishnae*
2. *F. glomerata*
3. *F. ben jamina*

Family: Moraceae

Origin: India

Description: The tree has gracefully drooping branchlets and glossy leaves, oval with an acuminate tip. The fruit is distinct. The fruit is in fact an enclosed inflorescence, sometimes referred to as a syconium, an urn-like structure lined on the inside with the fig's tiny flowers. Possess a white to yellowish sap (latex).



Picture 24: Tree- *Ficus* spp.

Economic Importance:

1. *F. benjamina* wood is suitable for making match- boxes. Bark is used for making ropes. Decoction of leaves is mixed with oil and applied to ulcers.
2. *F. glomerata* powder from roasted fruits is used as breakfast food. Leaves used as fodder. Leaves used also in bilious affections. Bark given in diarrhoea and diabetes. Fruits considered stomachic and carminative, used in hemoptysis. Latex used in piles and diarrhoea; also used for bird- lime. Wood lasts well under water and used for well- curbs, cheap furniture, and fuse box fittings; also suitable for match- boxes. Bark yields tannin. Decoction of bark used as a vulnerary.

Family: Ginkgoaceae

Genus: *Ginkgo*

Species: *G. biloba*

Common name: Maidenhair tree, bal kunwari

Origin: Japan

Description: The tree has an angular crown. The leaves are unique among seed plants, being fan-shaped with veins radiating out into the leaf blade, sometimes bifurcating. The old popular name "Maidenhair tree" is because the leaves resemble some of the pinnae of the Maidenhair fern. Ginkgos are dioecious. Male plants produce small pollen cones with sporophylls each bearing two microsporangia spirally arranged around a central axis. Female plants do not produce cones. Two ovules are formed at the end of a stalk, and after pollination, one or both develop into seeds.



Picture 25: Tree/Flower of *G. biloba*

Economic Importance:

- The kernels are eaten roasted or cooked; toxic if eaten raw. Seeds are used in the preparation of a detergent and are also employed as expectorant and sedative. Fruit contains a volatile oil.
- Wood is used for manufacturing chessboards and toys in Japan and China.
- The nut-like gametophytes is consumed as food in China.
- The extract of the Ginkgo leaves contains flavonoid glycosides and terpenoids (ginkgolides, bilobalides) and has been used pharmaceutically.

Family: Proteaceae

Genus: *Grevillea*

Species: *Grevillea robusta*

Common name: Silver-oak, silky- oak

Origin: Australia

Description: It is a fast growing evergreen tree with dark green delicately dented bipinnatifid leaves reminiscent of a fern frond. These leaves are greyish white or rusty undersides. Its flowers are golden-orange bottlebrush-like blooms. The fruits are with one or two flat, winged seeds.



Picture 26: Flowers of *Grevillea robusta*

Economic Importance:

- Source of green manure.
- Wood used for ornamental panelling, parquet floors, furniture, veneering, and plywood.
- Bark contains a gum and tannin.
- It is used in musical instrument making, as a top for the guitar.
- Before the advent of aluminium, the timber from this tree was widely used for external window joinery as it is resistant to rotting. It was also popular for making furniture.
- It is the best tree which can be used for fencing and it is one of the fastest growing trees.

Family: Myrtaceae

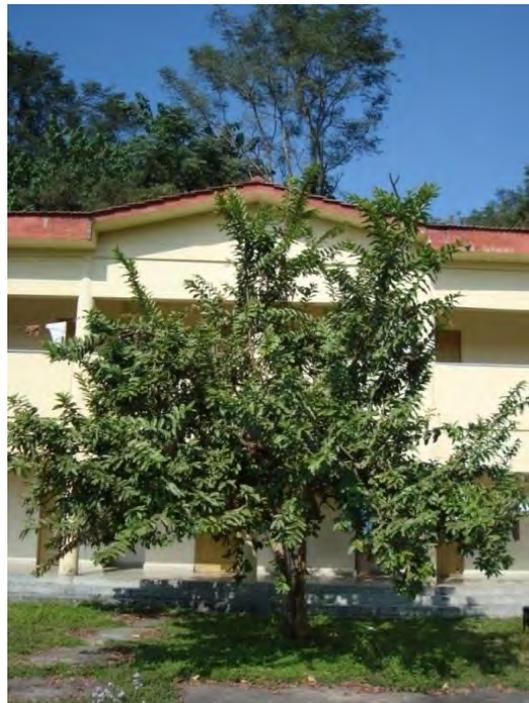
Genus: *Psidium*

Species: *P. guajava*

Common name: Guava, Amrud

Origin: Mexico

Description: A small tree with spreading branches, the guava is easy to recognize because of its smooth, thin, copper-colour bark that flakes off. The leaves, aromatic when crushed, are evergreen, opposite, short-petiole, oval or oblong-elliptic, leathery, with conspicuous parallel veins. Faintly fragrant, the white flowers, borne singly or in small clusters in the leaf axils. The fruit, exuding a strong, sweet, musky odour when ripe, may be round, ovoid, or pear-shaped, and thin, light-yellow skin, frequently blushed with pink.



Picture 27: Tree- *P. guajava*

Economic Importance:

- Fruits are eaten as such or canned, preserved spiced or made into jam, butter, marmalade, pies, ketchups and chutneys. Are one of the richest source of Vitamin C. Dehydrated guavas may be reduced to a powder which can be used to flavour ice cream, confections and fruit juices, or boiled with sugar to make jelly, or utilized as pectin to make jelly of low-pectin fruits. Seeds yield a fatty oil. Leaves contain an essential oil which is used as flavouring.
- In Malaysia, the leaves are used with other plant materials to make a black dye for silk. In South East Asia, the leaves are employed to give a black colour to cotton; and in Indonesia, they serve to dye matting.
- Leaves are used as an astringent for bowel troubles; also used for tanning. Decoction of bark given in diarrhoea. Fruits tonic, cooling, and laxative, useful in colic and bleeding gums. The leaf decoction is taken as a remedy for coughs, throat and chest ailments, gargled to relieve oral ulcers and inflamed gums; and also taken as a vermifuge, and treatment for leucorrhoea. It has been effective in halting vomiting and diarrhoea in cholera patients. It is also applied on skin diseases. A decoction of the new shoots is taken as a febrifuge. The leaf infusion is prescribed in India in cerebral ailments and nephritis. A combined decoction of leaves and bark is given to expel the placenta after childbirth.

Family: Bigoniaceae
Genus: *Jacaranda*
Species: *J. mimosaeifolia*
Common name: Nili gulmohar
Origin: Brazil

Description: Blue jacaranda is a small to medium sized tree and feathery foliage with light irregular crown. Leaves are borne at the ends of branches, bipinnate, symmetrical like a fern. Flower has a 5 toothed calyx, a curved tubular 2-5 lobed corolla and four stamens, hairy at the tip. Fruit is a capsule, broadly ovate or sub-orbicular ion shape with many compressed seeds.



Picture 28: Leaves of *J. mimosaeifolia*

Economic Importance:

- Jacaranda is mainly planted as an avenue plant but the fragrant wood is locally used for tool–handles. The wood is light and slightly fragrant. There are purple to greyish streaks in its tissues, which make the grain attractive. The tree is generally not felled for its wood or timber. The branches and stem of the dead and dry trees are utilised, generally as firewood. The trees, putting up good stature, if no longer required on the avenues, are converted into timber and used for cheap furniture, ceiling and floor planking, etc.
- The dried leaves of Jacaranda are used in an ointment for healing wounds. Leaves also used as a vulnerary, their infusion given as a pectoral.
- An infusion of the bark is used as a lotion for washing ulcers. The bark and leaves are also used for treating syphilis and gonorrhoea. Bark and leaves are used for treatment in syphilis and blennorrhagia.

Botanical name:

1. *L. indica* Linn.
2. *L. speciosa* Pers.
3. *L. tomentosa* Presl.

Family: Lythraceae

Description: Small to medium sized deciduous tree. Leaves opposite, narrowly elliptic; young leaves pubescent beneath; mature leaves glabrous on both sides. Flowers white, fragrant in terminal panicles, calyx tube copular, capsules ovoid, each filled with 20- 30 seeds.



Picture 29: Tree- *Lagerstroemia spp.*

Economic Importance:

- The timber is used for building construction such as posts, beams, rafters, etc. Locally used for agricultural implements, carts, furniture, oars, canoes and cooperage. It is suitable for boxes, tool- handles, picker arms, golf-stick shafts, bent wood furniture etc. Selected timber with short wavy grain can make decorative furniture. It is found suitable for making plywood of various grades meeting the general requirements of general purpose plywood, preservative treated plywood, fire retardant plywood, concrete shuttering plywood and marine plywood.
- It is good for use as charcoal and fuel wood.
- Bark and leaves contain of tannin which is used for making skins.
- Tree is lopped for fodder. Tusser silkworms are also fed on the tree.

Family: Sapindaceae

Genus: *Litchi*

Species: *L. chinensis*

Common name: Litchi

Origin: China

Description: It is a medium-sized evergreen tree, with alternate pinnate leaves, with 2-8 lateral leaflets; the terminal leaflet is absent. The newly emerging young leaves are a bright coppery red at first, before turning green as they expand to full size. The flowers are small, greenish-white or yellowish-white, produced in panicles. The fruit is a drupe. The edible flesh consists of a highly developed aril enveloping the seed. The centre contains a single glossy brown nut-like seed.



Picture 30: Fruits of *L. chinensis*

Economic Importance:

- Fleshy, sweet arils covering the seeds are delicious; they are eaten as such or canned. Dried fruits, Litchi nuts are exported from China. The flesh of dried litchis is eaten like raisins. Chinese people enjoy using the dried flesh in their tea as a sweetener in place of sugar. To a small extent, litchis are also spiced or pickled, or made into sauce, preserves or wine. Litchi seeds are used as anodyne in neuralgic disorders and orchitis.
- Ingested in moderate amounts, the litchi is said to relieve coughing and to have a beneficial effect on tumours and enlargements of the glands. A tea of the fruit peel is taken to overcome smallpox eruptions and diarrhoea. In India, the seeds are powdered and, because of their astringency, administered in intestinal troubles, and they have the reputation there, as in China, of relieving neuralgic pains. Decoctions of the root, bark and flowers are gargled to alleviate ailments of the throat.
- Bark contains tannin.

Family: Sapotaceae
Genus: *Madhuca*
Species: *M. Longifolia*
Common name: Mahua, Mohua
Origin: India

Description: Medium to large sized deciduous tree, spreading branches and a large rounded crown. Leaves are clustered at the end of branches, elliptic, obovate. Flowers are small; cream- coloured and produced in clusters at end of branches. Fruit a green egg- shaped fleshy berry. Seeds are either double convex or flattened on one or two sides.



Picture 31: Tree- *M. longifolia*

Economic Importance:

- The timber can be put to a variety of uses such as building purposes as beams, door and window frames, posts etc. It is suitable for heavy work such as bridges, pile, sugar presses, cart wheels, ships, boats, sport goods, furniture etc. When seasoned it is suitable for agricultural implements, drum and carving. It is a good fuel wood.
- The tree is of multiple use to the local inhabitants for its leaves, flowers, fruits and bark furnish forest produce of commercial importance. The fleshy corollas are edible as they are a rich source of sugars, vitamins, calcium and essential oil. Flowers are largely used for preparation of country made distilled liquor. The flowers can also be fed to the livestock. The outer part of the fruit is eaten raw or cooked and the inner part is made into flour for cakes. The seed kernel yields 5.1% of fatty oil which constitutes "mahua oil or butter of commerce". The oil is used in cooking, for burning in lamps, in the manufacture of margarine and soap and many other minor uses. The oil cake is used as a fertilizer, fish poison and as a cheap substitute for shikakai for washing hair. There is a great scope for expanding industrial units to tap non-edible of this species.
- The leaves yield fodder of medium quality and are lopped in M.P. Maharashtra, Orissa and U.P. at the times of scarcity.

ECONOMIC IMPORTANCE OF *MALLOTUS PHILIPPENSIS*

Family: Euphorbiaceae

Genus: *Mallotus*

Species: *M. philippensis*

Common name: Kamala, Kamela

Origin: India

Description: It is an evergreen tree. Leaves alternate, borne on long stalks. Female flowers in erect, long spikes: male flowers are yellow in colour. Fruits are roundish, 3-lobed and densely covered with reddish brown, powdery substance and minute hair which are easily rubbed out.



Picture 32: Flowers of *M. philippensis*

Economic Importance:

- A dye called kamela powder is obtained from the glandular hairs of the fruits. Also employed as an anti-oxidant for ghee, as an anthelmintic, and for cutaneous affections. Kamela is chiefly for destroying tapeworms. The kamela powder is taken with milk. “Kamela” is purgative. It’s also useful in the treatment of skin diseases, like ringworm and scabies. Kamela powder is used by women as sendur (vermillion).
- Seeds yield a fatty oil which forms a good substitute for tung oil in the formulation of rapid drying paints and varnishes, and hair fixers and ointments; cake used as manure and, in combination with sawdust for making insulating boards, and cork substitutes. Due to the good drying properties the oil is much valued in the painting works.
- Wood suitable for rafters, tool handles, match boxes, and small turnery articles. Leaves used for fodder. Bark contains tannin.

Family: Anacardiaceae

Genus: *Mangifera*

Species: *M. indica*

Common name: Mango, Aam

Origin: India

Description: Large evergreen tree with a dense dome-shaped crown. Leaves bluntly acuminate, dark glossy green, pinkish when young, and base acute. Panicles conical, flowers small, greenish yellow, scented, male and bisexual on the same panicle. Fruit a fleshy drupe, generally yellow when young and contains one seed.

Economic Importance:

- Wood is extensively used for low-cost furniture, floor, ceiling boards, window frames, heavy packing cases, match splints, brush backs, oar blades, agricultural implements etc. Also suitable for tea chest plywood. A hard charcoal of high calorific value is obtained from mango wood. After preservative treatment, it can be used as a substitute for teak as beams, rafters, trusses, and door and window frames. Suitable for slate frames, ammunition boxes, bobbins, carving and turnery work.
- The bark possesses 16% to 20% tannin and has been employed for tanning hides. It yields a yellow dye, or, with turmeric and lime, a bright rose-pink. The bark contains mangiferine and is astringent and employed against rheumatism and diphtheria in India. The resinous gum from the trunk is applied on cracks in the skin of the feet and on scabies, and is believed helpful in cases of syphilis.
- Mango kernel decoction and powder (not tannin-free) are used as vermifuges and as astringents in diarrhoea, hemorrhages and bleeding hemorrhoids. The fat is administered in cases of stomatitis. Extracts of unripe fruits and of bark, stems and leaves have shown antibiotic activity
- A somewhat resinous, red-brown gum from the trunk is used for mending crockery in tropical Africa. In India, it is sold as a substitute for gum arabic.
- Dried flowers are of medicinal value and used for curing dysentery and catarah of bladder. It is a cure for wasp sting, rubbed between hands and left to dry.
- Mango fruit is one of the delicious fruit of India exported to many countries. The green unripe fruits are used in curries, sharbats and pickles.



Picture 33: Tree- *M. indica*

Family: Calophyllaceae

Genus: *Mesua*

Species: *M. ferrea*

Common name: Nahor, Nag kesar

Origin: India

Description: Evergreen tree, leaves opposite, decussate, very variable, linear, lanceolate, oblong lanceolate, elliptic oblong, obtuse or acute at the base. Leaves crimson red turning pink and ultimately becoming dark green. Flowers white; sweet scented axillary and terminal on short and stout peduncles usually solitary.



Picture 34: Tree- *M. ferrea*

Economic Importance:

- Much planted as an ornamental around the temples and as avenue tree etc.
- A good ornamental tree with almost all its parts very useful. The timber is very durable and used for various purposes.
- The seed oil, dried flowers are very fragrant, stamens stuffed in pillows for their pleasant scent in Madura, (Indonesia).The fruits and seeds are sometimes eaten.
- The oleo-resin from the bark, roots and immature fruits sometimes used as a substitute for Canada balsam.
- The parts used in various medicines include root, bark, leaves, a paste and a syrup of the flowers and seed oil, etc.

Family: Pandanaceae
Genus: *Pandanus*
Species: *P. furcatus*
Common name: Ran-keura
Origin: India

Description: Plants vary in size from small shrubs, up to medium-sized trees. The leaves are strap-shaped. They are dioecious, with male and female flowers produced on different plants. The female tree produces flowers with round fruits that are also bract-surrounded. The fruits are globose, and have many prism-like sections, resembling the fruit of the pineapple.



Picture 35: Tree- *P. furcatus*

Economic Importance:

- Used for handicrafts. Craftswomen collect the pandan leaves from plants in the wild. Only the young leaves are cut so the plant will naturally regenerate. The young leaves are sliced in fine strips and sorted for further processing. Later, the weavers will produce basic pandan mats of standard size or roll the leaves into pandan ropes for other designs. This is followed by the colouring process, in which the pandan mats are placed in drums with water-based colours. After drying, the coloured mats are shaped into the final product, for instance a place mat or a jewellery box.
- "Kewra" is extract distilled from the *Pandanus* flower, used to flavor drinks and desserts in Indian cuisine.
- Leaves are used in Southeast Asian cooking to add a distinct aroma to rice and curry dishes such as *nasi lemak*, *kaya* ('jam') preserves, and desserts such as pandan cake. Pandan leaf can be used as a complement to chocolate in many dishes, such as ice cream. Fresh leaves are typically torn into strips, tied in a knot to facilitate removal, placed in the cooking liquid, and then removed at the end of cooking. Dried leaves and bottled extract may be bought in some places.

Family: Fabaceae

Genus: *Peltophorum*

Species: *Peltophorum africanum*

Origin: Uganda

Description: Semi-deciduous to deciduous trees with a spreading, untidy canopy. The leaves are acacia-like and silver-grey covered with fine hair. The leaves are twice compound with a pair of leaflets at the tip; alternate; up to nine pairs of pinnate each with 10-20 pairs of leaflets. Flowers form upright, showy sprays of bright yellow flowers with crinkled petals on the ends of branches.



Picture 36: Tree- *Peltophorum africanum*

Economic Importance:

- The wood is used to make furniture, axe handles, buckets and ornaments; it is also used as fuel.
- Young leaves and pods are eaten by livestock.
- Flowers provide a high yield of nectar and pollen for bee-keeping. The timber can be used for furniture.
- The wood is good for fuel. It makes a good shade tree for both livestock and humans.
- Roots are used to heal wounds, toothache and throat sores; root, leaves and bark used to clear intestinal parasites and relieve stomach problems; bark relieves colic; stem and root used for diarrhoea and dysentery. It is also used to treat eyes.

Botanical name:

1. *P. dactylifera* Linn.
2. *P. sylvestris* Roxb.

Family: Arecaceae

Origin:

1. *P. dactylifera* - India
2. *P. sylvestris* – India

Description: It is a medium-sized tree. The leaves are pinnate, with spines on the petiole and about 150 leaflets; the leaflets are 30 cm long and 2 cm broad. The full span of the crown ranges from 6–10 m.



Picture 37: Tree- *Phoenix spp.*

Economic Importance:

- *P. dactylifera* dates are rich in sugars and eaten fresh dried; also used in bakery and confectionery and made into jams and jellies and preserves. They are demulcent, expectorant, and laxative, also used in respiratory diseases and fever. Brandy of good quality is prepared from dates. Seeds (stones) when ground or softened by soaking in water are used for feeding goats, camels, and horses and have been successfully substituted as poultry feed. Sap is sweet and nutritive and laxative; used for preparation of jaggery and ugar. Leaves used for thatching and for making mats, fans, baskets, ropes etc. Petioles make light walking- sticks, also used for fishing floats; also yields a fibre which together with other suitable material is used for insulating boards. Fibre from green spathes used for ropes. Terminal leaf- bud consumed as a vegetable. Wood used for house construction, bridges, water conduits. Pruning of leaves used as manure. Tree yields a gum used in diarrhoea. Pollens exhibit gonadotropic activity in rats, an oestrogenic substance isolated from the fatty oil of dried pollen.
- *P. sylvestris* tree is trapped for its sap used for making jiggery and sugar sap, called "Nira" is a refreshing drink; after fermentation it forms toddy. Nira is a good source of vitamin B and also contains vitamin C. Palm *gur* is said to be more nutritious than cane *gur*. Fruits edible, considered restorative; maybe preserved as such or in the form of jams and jellies. Leaves used for thatching and for making mats, fans, baskets, bags, brooms, fishing-nets, etc.; also yields a soft fibre. Leaves lopped for fodder. Wood used for temporary construction, bridges and piers, and tent pegs. Trunks freed from pith used as water conduits. Roots used for toothache.

ECONOMIC IMPORTANCE OF *PLUMERIA ACUTIFOLIA*

Family: Apocynaceae

Genus: *Plumeria*

Species: *P. acutifolia*

Common name: Pagoda tree

Origin: Mexico

Description: A small tree, planted as an ornamental. Trunk is usually leaning and often branched. Leaves are long, narrow, clustered near the end of branches. Branches have many scars showing where leaves have fallen off. White latex drips out where a leaf is broken off, or from any cut in bark or stems.



Picture 38: Tree- *P. acutifolia*

Economic Importance:

- Bark is used as a stimulant, in decoction used as a purgative, febrifuge, and emmenagogue; also used in dropsical and venereal affections and said to be a powerful anti-herpatic.
- Latex rubefacient and purgative; useful in treatments for itch, rheumatism, and gum troubles.
- Root cathartic.
- Wood used for making drums and other musical instruments supposed to be free from termites.

Family: Annonaceae
Genus: *Polyalthia*
Species: *P. longifolia*
Common name: Devdaru
Origin: India

Description: Tall, evergreen tree with a conical crown. Short but numerous branches and long; tapering; narrow and drooping leaves with wavy margins. Leaves narrowly lanceolate, quite glabrous, faintly gland dotted with wavy margins. Flowers yellowish green, long in fascicles or very short umbles.



Picture 39: Tree- *P. longifolia*

Economic Importance:

- The wood is tough and flexible, moderately hard but not very durable. In south India, it is used for making drums. In china, it is used for matches.
- The tree is planted for its dense shade and elegant appearance.
- Bark is used medicinally as a febrifuge.
- The fruits in times of scarcity are eaten by humans and all times by birds or monkeys.
- Leaves are used for ornamental decoration in festivals. The tree is a main attraction in gardens throughout India. The tree can be cut into various shapes and maintained in required sizes.

Family: Fabaceae

Genus: *Millettia*

Species: *M. pinnata*

Origin: India

Common name: Karanj

Description: Deciduous tree. The leaves are a soft, shiny burgundy in early summer and mature to a glossy, deep green as the season progresses. Small clusters of white, purple, and pink flowers blossom on their branches throughout the year, maturing into brown seed pods. *Millettia pinnata* is often known by the synonym *Pongamia pinnata* as it was moved to the genus *Millettia* only recently.



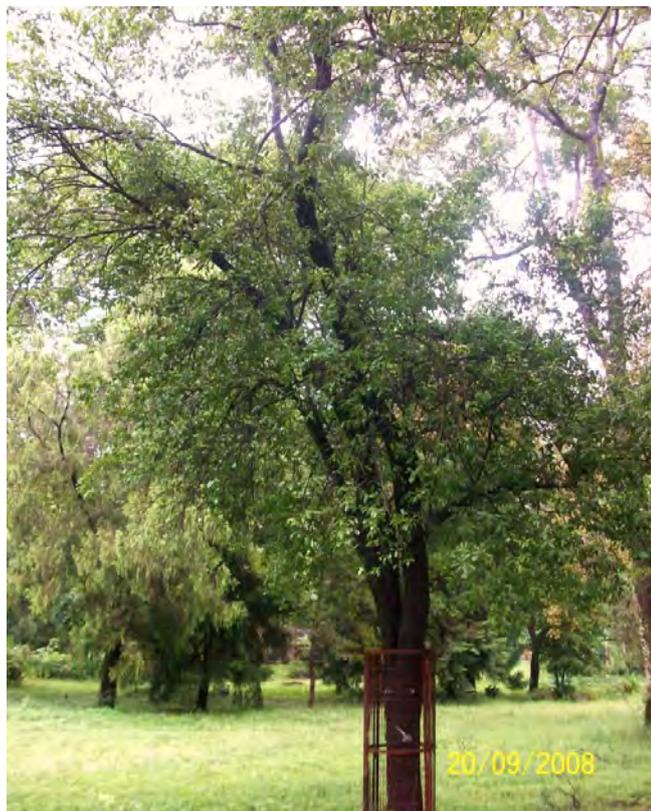
Picture 40: Tree- *M. pinnata*

Economic Importance:

- Seeds yield fatty oil, Pongam oil that is used in tanning industry for dressing E.I. leathers; it also finds use in the preparation of washing soaps, and candles, and as a lubricant for heavy lathes, chains, enclosed gears and heavy engines, and bearings of small gas engines.
- Medicinally, it is applied in herpes, scabies, leucoderma, and other cutaneous diseases. Internally it is used in dyspepsia with sluggish liver. **Karanjin** is the active principle. Juice of leaves prescribed in flatulence, dyspepsia, diarrhoea and for cough; also used in leprosy and gonorrhoea. Juice of roots used for cleansing foul ulcers and fistulous sores and for cleaning teeth and strengthening gums.
- Seed cakes used as manure.
- Wood used for yokes of bullock- carts, ploughs, cart- wheels, rafters, thatched cottages, oil mills, furniture, and small turnery articles. Its use as pattern wood and for veneering has also been suggested.
- Leaves lopped for fodder, act as a galactagogue. Roots and leaves used as fish poison.
- Bark yields fibre, used for cordage. Fresh bark given for piles. Decoction of bark used in beri- beri.

Family: Santalaceae
Genus: *Santalum*
Species: *S. album*
Common name: Chandan
Origin: India

Description: Small to medium sized tree evergreen, with slender drooping branches. Leaves thin, opposite, ovate lanceolate, blade entire, axillary or terminal paniced cymes. Perianth campanulate, stamens four alternating with four rounded obtuse scales (lobes). Drupe globose with hard- ribbed endocarp.



Picture 41: Tree- *S. album*

Economic Importance:

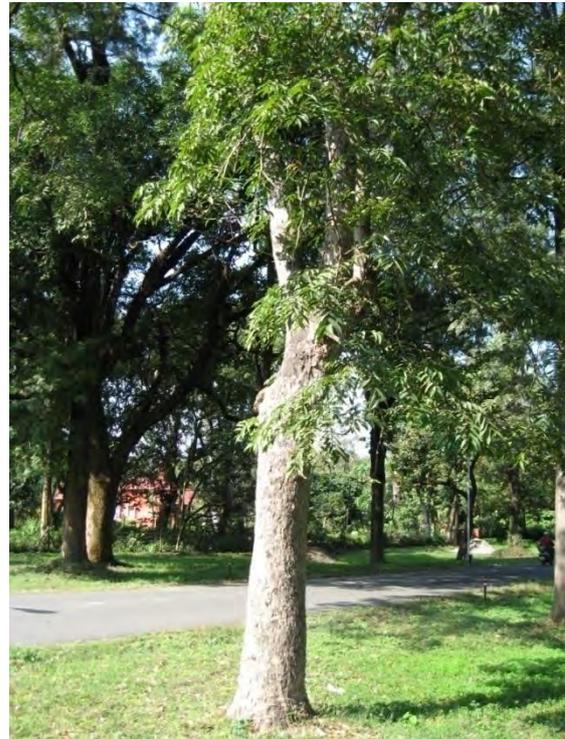
- The fragrant heartwood found in the stem and the root is the most economically important part of the tree. The wood is converted into chips and steam- distilled to produce oil.
- The sapwood which is used for producing „agarbattis“: Fragrance of sandal is due to Santanol, a polythenol.
- Both the wood and oil are used in medicine. Sandal wood is known to dissipate the effect of hot sun or fever, satiate thirst and leaves a cool but refreshing feeling. The wood ground into paste, gives relief if applied on local inflammation, on boils on forehead in fever and on skin diseases. Sandal wood decoction is given to cure defects of genitourinary tract. In migraine, sandal paste or oil (in dilute form) maybe applied in nostrils for relief and cure. Sandal paste is beauty-aid too.
- Sandalwood chips are generally used for making agarbattis. Seasoned sapwood maybe carved into curios, toys, carom coins and lacquerware.
- The perfumery preparations called attars are also prepared by hydrodistillating the volatile essence of flowers onto sandal oil. In medicine, it finds use as an antiseptic, antipyretic, antiscabietic, diuretic, expectorant, stimulant, and for treatment of bronchitis, dysuria, gonorrhoea and urinary infections.

Family: Sapindaceae
Genus: *Sapindus*
Species: *S. mukorossi*
Common name: Ritha
Origin: China

Description: The leaves are alternate, pinnate, with 14-30 leaflets, the terminal leaflet often absent. The flowers form in large panicles, each flower small, creamy white. The fruit, called a soap nut, is a small leathery, yellow ripening blackish, containing one to three seeds.

Economic Importance:

- The soap nuts are used as a detergent; also utilized for polishing jewellery and for washing and bleaching cardamoms. Soap nuts contain saponin, a natural detergent which is used to clean clothes. Soap nuts have become popular as an environmentally friendly alternative to manufactured, chemical detergents. A few nuts can be placed in a cotton drawstring bag in with a washload and reused several times. Soap nuts are safe for washing silk, woollens and other delicate fabrics. Saponin finds application as a textile auxillary and also as an emulsifier in insecticides.
- Fruits emetic and expectorant, used in excessive salivation, epilepsy, and chlorosis. Soap nuts, especially are used medically as an expectorant, emetic, contraceptive, and for treatment of excessive salivation, epilepsy, chlorosis, and migraines. Studies show that saponin from soap nuts inhibits tumor cell growth. Soap nuts are among the list of herbs and minerals in Ayurveda. They are a popular ingredient in Ayurvedic shampoos and cleansers. Soap nuts have gentle insecticidal properties and are traditionally used for removing lice from the scalp. Soap nuts are antimicrobial and are beneficial for septic systems and greywater. Soap nuts are used in the remediation of contaminated soil. They act as fish poison; powdered seeds considered insecticidal. Fruit contains saponins which can be extracted by boiling the powdered fruits.
- Kernels contain a fixed oil which can be used for soap manufacture, and the exhausted cake as a filler and fertilizer.
- Wood finds use in charcoal- making.



Picture 42: Tree- *S. mukorossi*

ECONOMIC IMPORTANCE OF SARACA ASOCA

Family: Fabaceae

Genus: *Saraca*

Species: *S. asoca*

Common name: Ashok

Origin: India

Description: It is small evergreen tree. Leaves paripinnate, stipules intra-petiolar, united, and leaflets 4-6 pairs, oblong, lanceolate, glabrous. Flowers orange to scarlet, in dense corymbose panicles; Calyx yellowish orange to scarlet, petaloid, cylindrical, four lobed. Petals absent. Pods tapering at both ends.



Picture 43: Tree- *S. asoca*

Economic Importance:

- Bark astringent used in uterus infections. It has a stimulating effect on endometrium and ovarian tissue and is useful in menorrhagia due to uterine fibroids, in leucorrhoea and internal bleeding haemorrhoids, and hemorrhagic dysentery. Bark also contains an oxytocic principle. Flowers are also used as a uterine tonic; used also in biliousness, hemorrhagic dysentery, and diabetes.
- In general, it is considered as the best female tonic.
- Fruits chewed as a substitute for areca nuts. Pods make good forage.
- The seeds are strengthening and the ash of plant is good for external application in rheum-arthritis.
- Wood used for plough and shafts.

Family: Anacardiaceae
Genus: *Semecarpus*
Species: *S. anacardium*
Common name: Bhilawa
Origin: India

Description: *Semecarpus anacardium* is a deciduous tree. Its leaves are 7-24 inches long and 2-12 inches wide mostly rounded at the tip. It has rounded, heart-shaped or narrowed leaf base with leathery in texture. Flowers are small and shorter than the leaves. Fruit is an inch long and shining. It turns black when ripe. The nut is about 2.5 cm long, ovoid and smooth lustrous black



Picture 44: Tree- *S. anacardium*

Economic Importance:

- Fleshy, orange cup of the fruit eaten when ripe, significantly astringent. Pericarp abounds in a black, oily, bitter, and highly vesicant juice, which has been traditionally used for marking linen. Vesicant juice which is known in the trade as Bhilawan Shell Liquid (BSL) is a rich source of phenols. A number of processes have been developed and patented for converting BSL into non- vesicating semi- solid or solid resins, which are utilised as bases for manufacture of varnishes, lacquers, enamels, paints, moulding compositions, and water proofing and insulating electrical materials. In the processes employed for extraction of shell liquid and subsequent treatment of the liquid for conversion into resins, catechol, an essential oil, and a high boiling phenolic constituent are obtained as by-products.
- Kernels edible; yield a semi- drying oil used as a wood preservative and as a lubricant for wooden axles of carts.
- Wood suitable for cheap and light furniture, packing boxes, and splints.
- Tree exudes a gum –resin used in leprosy and nervous debility.
- Juice from the pericarp is an ingredient of marking inks.
- Fruits used for ascites, rheumatism, asthma, epilepsy, and psoriasis, and also for warts and tumours. Biological tests have shown that extract of the fruit is effective against human epidermoid carcinoma of the nasopharynx in tissue culture; extract also shows hypoglycaemic action.

Family: Dipterocarpaceae

Species: *S. robusta*

Common name: Sal

Origin: India

Description: The bark of the young tree is smooth with a few long deep and vertical furrows. Leaves are ovate-oblong in shape. The flowers are whitish in colour. These come out in auxiliary racemose panicles covered with white pubescence.

Economic Importance:

- Sal wood ranks with teak and deodar as one of the best sleeper woods in India; and in great demand in the form of bellies and poles. After treatment, the poles are suitable for overhead electric, telegraph, and telephone lines. As domestic timber it is used for beams, scantlings, rafters, and floors, also used for piles, mine work and pit-props, bridges, dug-out boats, carriage and wagon buildings, spokes, fellows, and hubs of wheels, agricultural implements, tool handles, tent pegs, liquid storage vats, and beer and oil casks. Spent bark is suitable for the production of boards and isolation of cellulose.
- Tree yields an oleoresin called Sal Dammar or Bengal Dammar (*Laldhuna ral, dhup, guggal*) used as incense and also employed in paints and varnishes, and for caulking boats. It has been employed for hardening softer waxes for use in shoe-polishes, and for carbon papers and ribbons. Medicinally used as an astringent in diarrhoea and dysentery. Sal resin yields an essential oil called Chua oil, used as a fixative, and for flavouring chewing as well as smoking tobacco; also employed for ear troubles and cutaneous diseases.
- Seeds eaten after roasting; yield fatty oil, Sal butter, used locally for cooking and lighting and as an adulterant of ghee; also suitable as a substitute for cocoa butter in the manufacture of chocolates. Cake can be used as a feed for cattle and poultry.



Picture 45: Tree- *S. robusta*

Botanical name:

- *S. rupestris*
- *S. villosa*
- Family: Sterculiaceae

Origin:

- *S. rupestris* – Australia
- *S. villosa*- India

Description: A moderate sized deciduous tree with few spreading branches. Leaves long and broad crowded at the ends of branches, cordate, deeply palmately lobed, flowers yellow, polygamous, mostly male. Fruit follicle, each follicle sessile, spreading. Seeds several in each follicle.



Picture 46: Tree- *Sterculia* spp.

Economic Importance:

- The wood of *S. villosa* is used mainly for manufacturing tea-boxes and light packing cases.
- Also used in ship-building, inferior match-boxes and splints, three –ply work.
- It gives good fuel wood.
- Bark yields a coarse but strong fibre that is used for cordage and for making rough bags. It is used for breast bands of elephants for dragging timber and also for tying cattle.
- Seeds can be eaten after roasting or cooking.
- A dye is obtained from the pericarp.
- Bark also yields a gum used in veterinary medicine.

Family: Cupressaceae

Genus: *Taxodium*

Species: *T. mucronatum*

Common name: Mexican marsh-cypress, Montezuma marsh cypress

Origin: Mexico

Description: It is a large evergreen or semi-evergreen tree. The leaves are spirally arranged but twisted at the base to lie in two horizontal ranks. Leaves are alternate, simple, lanceolate, linear. The pale green, needle-like leaves are only deciduous in the colder sections of its range, remaining evergreen elsewhere. The cones are ovoid.



Picture 47: Tree- *T. mucronatum*

Economic Importance:

- The wood is used mainly in cases where resistance against decay is necessary rather than for any real strength. Mai uses comprise planks, furniture, railway ties, fence posts, and general construction work.
- The Wood is durable in contact with soil and other conditions favourable to decay. Also used for cooperage, piling, shingles, ships, and boats, coffins, sash, doors, and fence posts, caskets and general milling work.
- Can also be used for sulphate pulp suitable for writing and printing papers. The roots, bark and leaves are astringent and are used in the treatment of diarrhoea and bronchial troubles. Acrid resin used on wounds and ulcers.

Family: Lamiaceae

Genus: *Tectona*

Species: *T. grandis*

Common name: Teak

Origin: India

Description: *Tectona grandis* is a large, deciduous tree. The very large leaves are shiny above, hairy below. Flowers small, mauve to white and arranged in large, flowering heads. Fruit is a drupe and round, hard and woody, enclosed in an inflated, bladder-like covering; pale green at first, then brown at maturity. Each fruit may contain 0 to 4 seeds.

Economic Importance:

- Wood very durable, resistant to fungi. Used for poles, beams, trusses, columns, roofs, doors, window frames, flooring, planking, panelling, and staircases, and other constructional work. One of the best timbers for furniture and cabinet-making, wagon and railway carriages. Due to its better shape-retention ability, teak is popular in marine constructions and is a class by itself for boat- and ship building, particularly for decking. On account of its resistance to chemicals, teak articles are used in chemical laboratories; suitable for casks and vats for shipping corrosive liquids and for storing vegetable oils, fruit syrups, chutneys etc.
- Teak is employed for sound – boards of musical instruments, keys etc. and for different grades of plywood.
- Wood waste in the form of wood- shavings and sawdust is used for chip-boards, fibreboards, and plastic boards.
- Leaves contain about 6% tannin and a dye; also used for thatching. Oily product obtained by distillation of wood chips applied to eczema.
- Kernels yield fatty oil which is used in scabies and to promote the growth of hair. Flowers used in biliousness, bronchitis, and urinary discharges. Both flowers and seeds considered diuretic.
- Bark astringent, used in bronchitis. Root bark used for colouring matting.



Picture 48: Tree- *T. grandis*

Botanical name:

1. *T. arjuna*
2. *T. bellerica*

Family: Combretaceae

Origin: India

Description: Large, evergreen tree with generally fluted stem, spreading crown and drooping branches. Leaves sub-opposite, oblong on elliptic, hard, coriaceous, acute at the apex, base rounded. Flowers in paniced spikes, with hairy growth, small. Fruits ovoid or ovoid oblong, with raised woody wings, single-seeded, hard pericarp.

Economic Importance:

- ***T. arjuna:*** The timber is used for carts, agricultural purposes, boat building, mine props etc. It can also be used for general structural purposes such as house building, water traps, oars, masts, transmission poles. It is suitable for making of plywood of second grade and for tea chests. The wood has high calorific value, makes excellent firewood, and produces good quality charcoal for producer gas plants.
- ***T. bellerica* :** *Wood* in mixture with other hardwood species has been found suitable for manufacture of chemical pulps for writing, printing and wrapping papers. The kernels yield non-edible oil used in manufacture of soaps after blending with other oils. Leaves are highly valued as fodder for milch cattle. Leaves are also fed to tasar silkworm. The tree yields a copious gum.



Picture 49: Tree- *Terminalia spp.*

Common name: Chinese arborvitae, Morpankhi

Family: Cupressaceae

Origin: China

Description: An evergreen Tree. It is in leaf all year. The flowers are monoecious (individual flowers are either male or female, but both sexes can be found on the same plant) and are pollinated by Wind.



Picture 50: Tree- *Thuja orientalis*

Economic Importance:

- This plant is of high significance in Chinese herbalism where it is considered to be one of the 50 fundamental herbs. Both the leaves and the seeds contain an essential oil consisting of borneol, bornyl acetate, thujone, camphor and sesquiterpenes. The leaves also contain rhodoxanthin, amentoflavone, quercetin, myricetin, carotene, xanthophyll and ascorbic acid. The leaves are antibacterial, antipyretic, antitussive, astringent, diuretic, emmenagogue, emollient, expectorant, febrifuge, haemostatic, refrigerant and stomachic. Their use is said to improve the growth of hair. They are used internally in the treatment of coughs, haemorrhages, excessive menstruation, bronchitis, asthma, skin infections, mumps, bacterial dysentery, arthritic pain and premature baldness. The leaves are harvested for use as required and can be used fresh or dried. It is used internally in the treatment of palpitations, insomnia, nervous disorders and constipation in the elderly. The root bark is used in the treatment of burns and scalds. The stems are used in the treatment of coughs, colds, dysentery, rheumatism and parasitic skin diseases. Fruits and roots yield essential oils, and seeds fatty oil. Leaves also yield an essential oil used as a tonic, diuretic, and antipyretic.
- Twigs and leaves are a good source of tannin.
- A yellow dye is obtained from the young branches. Wood used for construction, cabinet making, cooperage, furniture, house- building, fence- posts, barrels and casks.

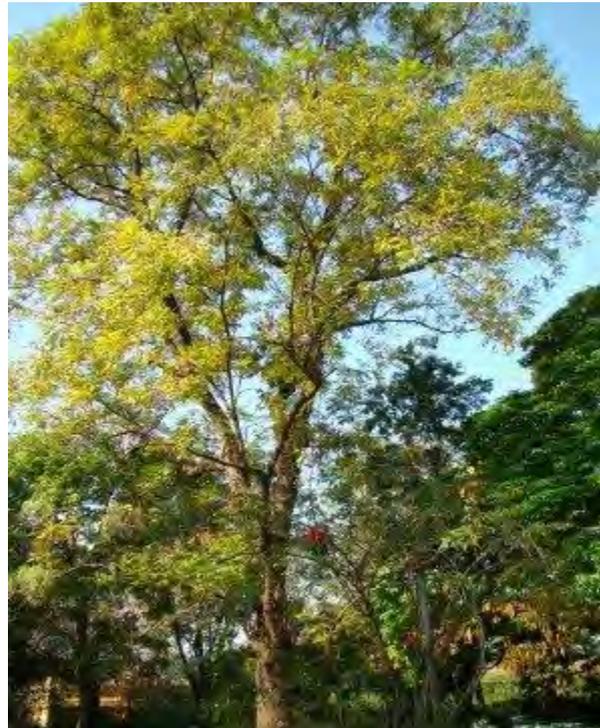
Botanical name:

1. *T. ciliata*
2. *T. serrata*

Family: Meliaceae

Origin: India

Description: Large deciduous tree, with a spreading crown. Leaves are long, usually imparipinnate: leaflets opposite or alternate, lanceolate, entire or wavy, acuminate, base oblique. Flowers honey scented, small, yellowish white, appear in drooping, terminal panicles. Fruit is a dark brown oblong capsule. Seeds are pale brown, small, winged at both ends.



Picture 51: Tree- *Toona spp.*

Economic Importance:

- The timber is suitable for grade 1 commercial -plywood and grade 1 moisture –proof plywood. It is also accepted as suitable for tea-chest plywood. It is suitable for making match boxes but is unsuitable for splints on account of its reddish colour. It is also used for making low grade pencils. Toon is also one of the woods suitable for making racquets.
- Toon is also used for making furniture, house construction, floors, boarding, panels of doors and windows and also for making boats, oars, carvings, musical instruments, masts etc.
- A red colouring matter is obtained from the flowers known as “gunar” which is used as a dye for woollen and cotton fibres with mordants; with safflower and turmeric, it produces sulphur-yellow colour. Bark is bitter, astringent, antiperiodic and used for infant dysentery.

ECONOMIC IMPORTANCE OF *XYLIA XYLOCARPA*

Family: Fabaceae

Genus: *Xylia*

Species: *X. xylocarpa*

Common name: Jambu, irul, pyinkado

Origin: India

Description: Medium to large deciduous tree. Leaves with one pair of pinnae at the end of common petioles, leaflets 2-6 pair, oblong acuminate. Flowers pale-yellow wetly scented in long pedunculate globose heads. Seeds ovoid, compressed, brown, smooth and polished.



Picture 52: Tree- *X. xylocarpa*

Economic Importance:

- The wood is difficult to season and is prone to surface cracking, splitting and warping. It is an extremely durable wood. It is a heavy constructional timber for railway sleepers, bridges, piles, girders, and decking, mine work and pit-props, wagon floor boards and general utility work. It is also used for making agricultural implements, boat-building and tool handles. Locally, it is used in house construction work for posts, beams and rafters, fence posts etc.
- A good substitute for sal and Teak for beams, house construction.
- Wood lasts well under water, it yields material for pulp.
- It is largely used for fuel and manufacture of charcoal.
- Decoction of bark given in gonorrhoea and diarrhoea; also used to stop vomiting and as a vermifuge. Fruits yield fatty oil. Leaves used as manure.

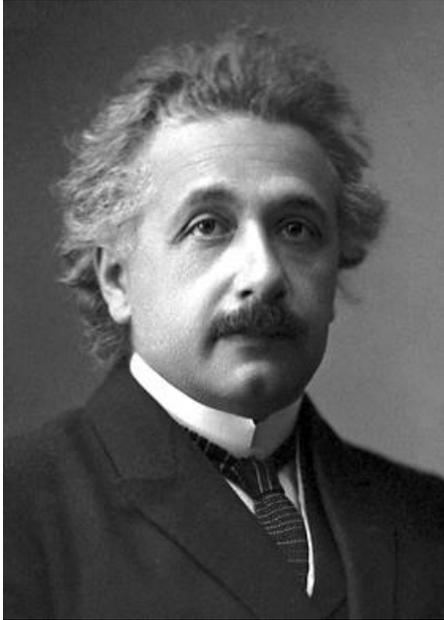
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The life of the individual has meaning only in so far as it aids in making the life of every living thing nobler and more beautiful.

Albert Einstein (The World As I See It, p. 104)

