



## Palmyra palm: Importance in Indian agriculture

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Palmyra tree is a tall and swaying tree well known as “*Borassus flabellifer*”. The word “Borassus” was derived from a Greek word and it means the leathery covering of the fruit and “flabellifer”, means fan-bearer. Palmyra palm tree belongs to the ‘palme’ family. Palakkad district of Kerala is popularly known as land of palmyra trees. Palmyra trees are known as the icon of this district and have a vast cultural, heritage and literary association. Many novels, stories and poems revolve around these trees. The Palmyra tree is the official tree of Tamil Nadu. In Tamil culture it is called karpaha , “nungu” “celestial tree”, and is highly respected because all its parts can be used. The Asian Palmyra palm is a symbol of Cambodia where it is a very common palm, found all over the country. It also grows near the Angkor Wat temple. In Indonesia the Palmyra tree is the symbol of South Sulawesi province. This plant has captured the imagination of Bengalis, especially in the words of Rabindranath Tagore whose nursery rhyme ‘Taal Gaach ek paye daariye, sab gaach chhariye, akaashete uki mare....’ literally tall tree standing on a single leg, surpassing all other trees, looking to the sky.... In Sahaj Path is a staple reading material in most of schools in West Bengal and Bangladesh.

### Scientific classification :

Kingdom	-	Plantae
(unranked)	-	Angiosperms
(unranked)	-	Monocots
(unranked)	-	Commelinids
Order	-	Arecales
Family	-	Areaceae
Sub-family	-	Coryphoideae
Tribe	-	Borasseae
Sub-tribe	-	Lataniinae
Genus	-	<i>Borassus</i>
Species	-	<i>Flabellifer</i>

**Synonyms of *Borassus flabellifer* :** (a) *Borassus*

*flabelliformis* (b) *Borassus sundaicus* (c) *Borassus tunicatus* (d) *Lontarus domestica* (e) *Pholidocarpus tunicatus* (f) *Thrinax tinicata*

**Common name:** (a) Fan palm, (b) Asian Palmyra palm, (c) Toddy palm, (d) Sugar palm, (e) Cambodian palm, (f) Kerigi, (g) Mak tan kok, (h) Panna-maram, (i) Taan, (j)Than, (k) Doub palm, (l) Tala palm, (m) Wine palm, (n) Borassus palm, (o) Great fan palm, (p) African fan palm, (q) Lontar palm, (r) Ron palm etc.



**Areas of cultivation :** Native to tropical regions of Africa, Asia and New Guinea. Palmyra palms are economically useful and widely cultivated, especially in South –East Asia. The Palmyra pump tree has long been one of the most important trees of Cambodia and India. It is native to South and South-east Asia, in the Indo-Malaya eco-zone. It is a palm tree of

the sugar palm group, is found from Indonesia to Pakistan. India, Jawa, Laos. Lesser Sunda Island, Malaya, Myanmar, Socotra, parts of China, Sri Lanka , Sulawesi, Thailand, Vietnam, Philippines, South and South-East Asia. Determining the natural distribution of *Borassus flabellifer* is essentially impossible as it is a widely planted crop plant. It is largely restricted to areas with seasonal rainfall and ranges from Western India through Indochina to the lesser Sunda Islands of Indonesia. *Borassus flabellifer* was also found in Queensland, Australia. Palmyra palm is a native to tropical Africa but cultivated and naturalized throughout India.

### Distribution of Palmyra palm –species-wise :

Species	Area
- <i>Borassus aethiopum</i> -	Tropical Africa and Madagascar
- <i>Borassus akeassii</i> -	West and Central Africa
- <i>Borassus flabellifer</i> -	Southern Asia from India to Indonesia
- <i>Borassus heineanus</i> -	New Guinea
- <i>Borassus madagascariensis</i> -	Madagascar

**Importance :**

– The palmyra tree is the official tree of Tamil Nadu. Highly respected in Tamil culture, it is called “karpaha Veruksham” (“celestial tree”) because all its parts have a use.

– The Asian palmyra palm is a symbol of Cambodia where it is a very common palm, found all over the country. It also grows near the Angkor Wat temple.

– In Indonesia the Palmyra tree is the symbol of South Sulawesi province.

– This plant has captured the imagination of Bengalis, especially in the words of Rabindranth Tagore whose nursery rhyme ‘Taal Gaach ek Paye daariye’ (literally Tall tree standing on a single leg...) in Sahaj Path is a staple reading material in most schools in West Bengal and Bangladesh.

– In India, it is planted as a windbreak on the plains. It is also used as a natural shelter by birds, bats and wild animals.

– Once upon a time, palmyra (*Borassus flabellifer*) trees dotted the wilderness and banks of water bodies in Tamil Nadu. From root to leaves, the trees had many uses. Products from the trees were used for food, wood, shelter and even as the source of toddy. So much was the prominence of the tree in Tamil Nadu that, palmyra was declared as the state tree of Tamil Nadu.

– There is no need to water the seeds at regular intervals. A tree is capable of growing up to 100 feet in 10 years. A tree can last 100 years.

– The white kernel of the ripe palm fruit after being left for a few months is used as an offering in Lakshmi Puja in various parts of Bengal and is also eaten raw.

**Description :** *Borassus flabellifer* is a robust tree and can reach a height of 30 metres (98 ft). The trunk is grey, robust and ringed with leaf scars; old leaves remain attached to the trunk for several years before falling cleanly. The leaves are fan-shaped and 3 m (9.8 ft) long, with robust black teeth on the petiole margins. Like all *Borassus* species, *B. flabellifer* is dioecious with male and female flowers on separate plants. The male flowers are less than 1 cm long and form semi-circular clusters, which are hidden beneath scale-like bracts within the catkin-like inflorescences. In contrast, the female flowers are golfball-sized and solitary, sitting upon the surface of the inflorescence axis. After pollination, these blooms develop into fleshy fruits 15–25 cm wide, each containing 1-3 seeds. The fruits are black to brown with sweet, fibrous pulp and each seed is enclosed within a woody endocarp. Young palmyra seedlings grow slowly, producing only a

few leaves each year (establishment phase), but at an as yet undetermined time, they grow rapidly, producing a substantial stem.

**Fruit :** The fruit measures 10 cm (3.9 in) to 18 cm (7.1 in) in diameter, has a black husk, and is borne in clusters. The top portion of the fruit must be cut off to reveal the sweet jelly seed sockets, translucent pale-white, similar to that of the lychee but with a milder flavor and no pit. The sweet jelly seed sockets occur in combinations of two, three or four seeds inside the fruit. The jelly part of the fruit is covered with a thin, yellowish-brown skin. These are known to contain watery fluid inside the fleshy white body. These seed sockets have been the inspiration behind certain sweets Sandesh called Jalbhara found in Bengal. The conventional way this fruit is eaten is when the outer casing is still unripe while the seeds are eaten as the fruit. But if the entire fruit is left to ripen, the fibrous outer layer of the palm fruits can also be eaten raw, boiled, or roasted. When this happens, the fruit takes a purple-blackish hue and tastes similar to coconut flesh. The skin is also eaten as part of the fruit similar to how mango skins are often consumed along with the fruit. Bengali People have perfected the art of making various sweet dishes with the yellowish viscous fluidic substance obtained from a ripe palm fruit. These include Mustard oil fried Taler Bora, alternately fried in Sunflower oil, or mixed with thickened milk to form Taal-kheer.

**Sap :** Obtaining the sap traditionally involves tapping the top shoots and collecting the dripping juice in hanging earthen pots. The juice so collected before morning is refreshing and light drink is extremely cool in sensation, and has a sugary sweet taste. The juice collected in evening or after fermentation becomes sour, and is called Tadi in Marathi. Tadi is consumed mostly by coastal villagers of Maharashtra as a raw alcoholic beverage. A sugary sap called toddy, can be obtained from the young inflorescence, either male or female. Toddy is fermented to make a beverage called arrack, or it is concentrated to a crude sugar called jaggery or Taal Patali in Bengali. It is called *Gula Jawa* (Javanese sugar) in Indonesia, and is widely used in Javanese cuisine. In addition, the tree sap is taken as a laxative, and is believed to possess medicinal virtues that have also been ascribed to other parts of the plant.

**Sprouts :** In the Indian states of Tamil Nadu, Andhra Pradesh, Telangana and Bihar, and in Jaffna, Sri Lanka, the seeds are planted and made to germinate and the fleshy stems (below the surface) are boiled or roasted and eaten. It is very fibrous and nutritious. The germinated seed’s

hard shell is also cut open to take out the crunchy kernel, which tastes like a sweeter water chestnut.

**Leaves :** The *Borassus flabellifer* leaves are used for thatching, mats, baskets, fans, hats, umbrellas, and as writing material. All the literature of the old Tamil was written in preserved Palm leaves also known as Palm-leaf manuscript. It was written with a sharpened iron piece. Most of the ancient literature in Telugu are written on palm leaves. In Indonesia the leaves were used in the ancient culture as paper, known as “Iontar”. Leaves of suitable size, shape, texture, and maturity were chosen and then seasoned by boiling in salt water with turmeric powder, as a preservative. The leaves were then dried. When they were dry enough, the face of the leaf was polished with pumice, cut into the proper size, and a hole made in one corner. Each leaf made four pages. The writing was done with a stylus and had a very cursive and interconnected style. The leaves were then tied up as sheaves. The stem of the leaves has thorny edges. Fences can be prepared from these stems by nailing them together. The skin of the stem can be peeled off and be used as rope and also used to weave into cots. In some part of Tamil Nadu, a variety of rice flour cake is prepared using the leaf. In the eastern part of India, the leaves are used to make hand fans. These are mostly used during the summer in parts of Assam and West Bengal.

**Trunk :** The stalks are used to make fences and also produce a strong, wiry fibre suitable for cordage and brushes. The black timber is hard, heavy, and durable and is highly valued for construction. In Cambodia, the trunks are also used to make canoes. The young plants are cooked as a vegetable or roasted and pounded to make meal.

**Crown :** When the crown of the tree is removed, the segment from which the leaves grow out is an edible cake.

**Cultivation of palmyra :** Complete guide on Palmyra tree farming involves in seed treatment, planting, pest management, irrigation, harvesting and uses.

**Varieties: SVPR-1 :**

**Soil :** Arid, deep sandy and loamy soils are suitable. Dry areas with low rainfall are also ideal.

**Propagation :** Germination of 63.25 % are achieved six weeks after sowing.

**Seed sowing :** Seed nut should be high yielder of padaneer and fruits, dwarf in stature, early and regular bearer, free from pests and diseases. Select matured fruit branches and yellow tinch in stylar region. Seeds are stored in shade for three weeks. Shrunken, weightless and bored seeds are rejected. Seeds may be directly sown in situ or in nursery to raise the seedlings. For direct sowing 3-4 whole

fruits are planted in pits (20 cm<sup>3</sup>) at 10m apart and half filled with sand and soil mixture. Pit is covered with dried leaves. Sowing may be taken up during rainy months. Germination takes place within 3 weeks.

**Nursery transplanting :** Seeds can be sown in mound formed by keeping sand to form a bed of 1 m broad, 60 cm height or nursery bed built with bricks of 2 m broad, 60 cm height. Seeds are sown in 10 cm space and covered with sand. About one year old seedling is lifted from the nursery and containerized in polythene bags. After rooting transplant in the main field.

**Spacing :** 3m x 3m (1110 palms/ha).

**Manuring :** Generally farmers adopt sheep penning to the palms. Application of 10 kg FYM per pit before planting. Dosage may be increased biannually till reaching 60 kg FYM/tree/year.

**After cultivation :** Consist of gap filling, inter ploughing, basin rectification in initial few years. Gap filling may be carried out by using containerized seedlings. Basin rectification has to be done before rains; it helps collection and storage of rain water.

**Pruning :** Pruning of 30% leaves @ 10% in phased manner.

**Intercropping :** Cowpea, moringa, green gram, Bengal gram, ber, amla, pomegranate, west Indian cherry and guava can be intercropped.

**Growth and yield :** Palmyra is slow grower. First frond appears in about 5 months. First fan shaped tree leaves appears only in the second year. When it attains the height of 12-18m, comes to flowering (13-15 years) for padaneer (sweet sap) purpose. Average of 100-200 litres are obtained for a period of 4 months from February to May. Padaneer and fruit yield are highly variable in individual palms.

**Tapping :** Extraction of sap and (Neera/Padaneer) from inflorescence is called tapping. According to sex of the palm and age of the inflorescence, different kinds of tappings are available.

**Yield :** (a)150 litres of padaneer/ tree/ year (b) 24 kg jaggery /tree/year (c) Jaggery recovery/litre of padaneer-180-250 g of jaggery.

**Uses :**

- The leaves are used for thatching, mats, baskets, fans, hats, umbrellas, and as writing material.
- The black timber is hard, heavy, and durable and highly valued for construction, especially in structures exposed to water, such as wharves, fences and boats.
- The young plants are cooked as a vegetable or roasted and pounded to make meal.

- The fruits are eaten roasted or raw, as are the young, jelly-like seeds.
- A sugary sap, called toddy, can be obtained from the young inflorescence, both male and female, and this is fermented to make a beverage called arrack, or concentrated to produce a crude sugar called jaggery/palm sugar.
- The roots can be dried to form Odiyal, a hard chewable snack.
- The recently germinated seeds form fleshy sprouts below the surface which can be boiled and eaten as a fibrous, nutritious food.
- The ripe fibrous outer layer of the fruits is edible after boiling or roasting.
- When the fruit is tender, the kernel inside the hard shell is an edible jelly that is refreshing and rich in minerals.
- When the crown of the tree from which the leaves sprout is cut one can make a cake.
- In ancient times, dried palm leaves were used to write manuscripts.
- In Indonesia the leaves were used in the ancient culture as paper, known as "lontar".
- The stem of the leaves has thorny edges. Fences can be prepared from these stems by nailing them together.
- The skin of the stem of the leaves can be peeled off and be used as rope and also used to weave into cots. In some part of Tamil Nadu, a variety of rice flour cake is prepared using the leaf.
- In the eastern part of India, the leaves are used to make hand fans. These are mostly used during the summer in parts of Assam and West Bengal.
- When the crown of the tree is removed, the segment from which the leaves grow out is an edible cake.
- Rubbing the inside of the toddy-collecting receptacle with lime paste prevents fermentation, and thereafter the sap is referred to as sweet toddy, which yields concentrated or crude sugar (gur in India; jaggery in Ceylon); molasses, palm candy, and vinegar.
- Small fruits are pickled in vinegar. In April and May in India, the shell of the seed can be punctured with a finger and the sweetish liquid sucked out for refreshment like coconut water.
- Tender fruits that fall prematurely are fed to cattle.
- People generally use the hard outer wood to posts, beams and for domestic purposes.
- The vacant stem of the Palmyra palm tree is considered as best for making water pipes.
- People can make fans, mats, baskets, buckets, hats, umbrellas and sandals from leaves. They can also

be used as a very good thatch.

- People also enjoy eating the jelly like pulp of the fruit and the soft kernels of young fruit very much.
  - The developed nuts and their enlarged, fleshy embryos are also cooked and eaten as vegetables.
  - Moreover, the midribs of the leaves and the fibres from their stalks has the ability to be used in making brushes and people use the net-like material at the base of the young leaf for making into torches as well.
  - If the fresh toddy is mixed with rice flour and gently heated until it ferments, it makes a precious stimulant poultice.
  - The fruit is popular as aperients (used to relieve constipation) and the ash attained after burning the flowers is used in prescriptions for biliousness (excess secretion of bile).
  - The tree has some religious values as well. They use the leaves and fruits on their ceremonial occasions by hanging them on doorways and also they use them on marriage shamianas.
  - The stalks are used to make fences and to make a strong, wiry fiber suitable for cordage and brushes. The black timber is hard, heavy, and durable and is highly valued for construction, such as for wharf pilings. In Cambodia, the trunks are also used to make canoes.
  - The fronds and trunk of the tree are used for roofing.
- Medicinal uses :** There are innumerable medicinal uses for all parts of the palmyra palm.
- Briefly, the young plant is said to relieve biliousness, dysentery, and gonorrhoea.
  - Young roots are diuretic and anthelmintic, and a decoction is given in certain respiratory diseases.
  - The ash of the spadix is taken to relieve heartburn and enlarged spleen and liver.
  - The bark decoction, with salt, is used as a mouth wash, and charcoal made of the bark serves as a dentifrice.
  - Sap from the flower stalk is prized as a tonic, diuretic, stimulant, laxative and anti phlegmatic and amebicide. Sugar made from this sap is said to counteract poisoning, and it is prescribed in liver disorders.
  - Candied, it is a remedy for coughs and various pulmonary complaints.
  - Fresh toddy, heated to promote fermentation, is bandaged onto all kinds of ulcers.
  - The pulp of the mature fruit relieves dermatitis.
  - Being rich in minerals and vitamins, sugar palm fruits are a healthy option for people on diet or suffering from diabetes. It is a rich source of vitamins B and C,

iron, zinc, potassium, calcium, phosphorus, thiamine, and riboflavin.

– Palmyra fruit is an excellent home remedy for prickly heat during summer season. A thin layer of sugar palm fruit jelly applied on the affected area has a soothing effect and immediately alleviates the itchiness associated with prickly heat.

– Sugar palm fruits are also effective in reducing the symptoms of chicken pox and enhance the rate of healing.

– Sugar palm fruit is also beneficial in treating inflammatory skin problems such as redness due to intense heat. A face pack made from sugar palm fruit is excellent for the skin even for people with sensitive skin. It prevents prickly heat, boils and redness of-the-face.

A poultice or a drink made from sugar palm fruit can effectively treat dermatitis. It can be safely used in infants and children as well.

– The palm fruit is ideal for treating burning sensation in the stomach.

– During summers use palm fruit, to keep body hydrated. It also replenishes the lost minerals and nutrients of the body and prevents painful urination and tiredness.

– It is used effectively to treat digestive problems and other stomach ailments. It is also used as a laxative.

– Sugar palm fruit is a good option for those who are on a diet. It also prevents malnutrition in children and adults.

– Palm fruit has anti-inflammatory and anti-oxidant properties. The fruit pulp helps to cure skin inflammations. It is used to treat nausea and vomiting as well as worm infestation. It is used as an expectorant and also as a liver tonic.

– Palm jaggery is also known as Palmyra palm sugar and is a natural sweetener. It is used extensively in cooking and has many health benefits; (a) Low glycemic index sugar helpful in reducing obesity and diabetes, (b) Provides a sustained and uniform energy supply to the body, (c) It is rich in many nutrients including vitamins B1, B2, B3, B6 and C

– Pure sandalwood powder is mixed with ground fresh sugar palm fruit with a little coconut water. This pack is applied in a thin coat on the face and left to dry after which it is washed off with cold water. This is a good remedy for treating and preventing boils, prickly heat and redness of the face.

– It is also effective for the inflammatory skin problems faced after sun exposure. A sterilized and 100% cotton cloth is taken and sterilized by boiling in water. The

cloth is soaked and cooled at room temperature. The fruit is taken and the outer skin on the top is peeled off, the pulp is ground in a mixer and spread on the cloth. This poultice is applied on the affected area for 15 to 20 minutes after which the cloth is removed.

**Palmyra palm jaggery (gur) nutrients:** Palmyra palm jaggery (gur) is much more nutritious than crude cane sugar. The fresh sap is reportedly a good source of vitamin B complex.

**Table 1 : Nutrient status of 100g of jaggery**

Sr. No.	Nutrients	Amount
1.	Protein	1.04%
2.	Fat	0.19%
3.	Sucrose	76.86%
4.	Glucose	1.66%
5.	Total minerals	3.15%
6.	Calcium	0.861 %
7.	Phosphorus	0.052%
8.	Iron per 100 g	11.01 mg
9.	Copper per 100 g	0.767 mg

#### **Nutritional facts of palmyra fruit :**

Nutritive value of palm sugar fruit per 100 g of raw ingredient:

**Table 2 : Nutrient value of palm sugar 100/g**

Sr. No.	Nutrition	Amount
1.	Water	77 g
2.	Protein	1 g
3.	Fat	0 g
4.	Carbohydrates	21 g
5.	Fibre	0 g
6.	Calcium	9 mg
7.	Phosphorus	33 mg
8.	Iron	0 mg
9.	Thiamine	.04 mg
10.	Riboflavin	.02 mg
11.	Niacin	.3 mg
12.	Vitamin C	5 mg

#### **Some of considerable information:**

– In some species the trunk develops a distinct swelling just below the crown, though for unknown reasons.

– Each seed is enclosed in a woody endocarp,

which protects it when the fruit is consumed by elephants and other frugivores.

- At germination, the young seedling extends downwards into the soil and only a few leaves are visible above ground, this provides some protection against frequent fires in its savanna habitat.

- In Indonesia, the leaves were used in the ancient culture as paper, known as lontar. For that one name of the tree is lontar palm.

- The palmyra palm has long been one of the most important trees of Cambodia and India, where it has over 800 uses.

- Palakkad district of Kerala is popularly known as land of Palmyra trees.

- The stem of the tree is black in colour and looks like cylinders.

- There is no need to water the seeds of palmyra palm at regular basis and a tree survives upto 100 years.

**Important forest plan :** There is no need to water the seeds at regular intervals. A tree is capable of growing up to 100 feet in 10 years. A tree can last 100 years. The trees have multiple uses starting from the leaves, that are made into housing material and used in craft works. The extract (pathaneer) from palmyra is good for health. Moreover, palmyra trees on banks of water bodies prevent soil erosion. Palmyra trees prevent soil erosion and help recharge the water table. In India, it is planted as a windbreak on the plains. It is also used as a natural shelter by birds, bats and wild animals. It is known as ‘karpaha veruksham’ too as all parts of the tree is used for some purpose.

**River will go dry if you destroy palmyra palm tree :** According to Tamil culture, Palmyra palm trees played an important role in water management in the ancient times. The ancestors had a planned vision for the future water needs of the generations that followed, but most importantly a well balanced ecosystem was maintained. Unlike, other trees, Palmyra palm’s roots go vertically into the ground, which in turn brought the ground water to various levels along the path. It irrigated the land, played a significant role in the circulation of water in the aquifers, river beds and rivers. Since the balance is natural and the balance of consumption was well maintained. Rivers remained perennial those times and these trees had its own significance. That is why these trees are considered as ‘celestial trees’. You could find all the traditional ponds or lakes they had dug with palmyra palms around like a fence.

**Causes of destruction :** The tree is facing extinction

because of construction activities, non availability of manpower to extract fruits, and increase in usage in brick kilns as firewood.

**Conclusion:** Our country has 121.1 crores of population according to 2011 census. To feed the ever-increasing population of our country is a great challenge. Day by day demand of foodgrain is increasing; on the other hand day by day per capita landholding is decreasing. Therefore, pressure on land to produce more obviously, deteriorating the soil quality means soil health is in alarming condition, along with lack of sufficient amount of irrigation water is making farmers helpless and hapless. Lack of proper price of few commercial crops, lack of proper export infrastructure, along with farmers are unable to take the advantages of WTO implications by producing quality products. Above all the things indicate that agriculture is passing through tough challenges. One of the ways to these challenges is providing more emphasis on non-tradition crops cultivation (crop diversification) to produce more food (many types of foods through value-addition). In this respect, cultivation of palmyra palm is important one. Palmyra palm tree has more than 800 uses; therefore, through cultivation of the palm, people will be economically, culturally, socially, religiously and environmentally benefitted. Less water requirement for cultivation, capacity of the plant to withdraw water from underground, longevity of the plant (nearly 100 years), low space utilizing capacity, soil erosion preventing capacity, capacity to recharge the water table, an excellent plant as windbreak, aboveall, it provides a natural shelter to birds (especially vulture), bats and wild animals. The plant has the most important characters and unique characters to be a commercial crop as well as a forest plant. Considering the importance of Palmyra palm tree cultivation, extension agencies at grassroots levels of society must accelerate their extension programme for bringing awareness on Palmyra palm tree cultivation as well government forest personnel must have a fresh look on Palmyra palm tree cultivation at forest to maintain the forest properly.

“The conservation of natural resources is the fundamental problem. Unless we solve that problem it will avail us little to solve all others”. —Theodore Roosevelt.