



Palmyra Palm and Its Value-Added Products

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Palmyra Palm (*Borassus flabellifer*), the state tree of Tamil Nadu, is a gift from nature which provides several ecological, medical, economic, and social advantages to society. This plant is capable of withstanding extreme weather conditions and natural disasters. It has several medicinal properties and commercial use in all of its parts. It is extensively distributed in dry and tropical regions, from South-East Asia to New Guinea, including India. Neera, Nungu, Jaggery, Toddy, Palmyra Vinegar, Wine, Spread, Yoghurt, Sugar, Jelly, Chocolate, and several ready-to-serve (RTS) products are made from palmyra pulp. This paper provides a detailed knowledge about the importance of palmyra, its value added (edible and non-edible) products and its impact on livelihood. There is a lack of awareness regarding the importance of palmyra products, hence government should support the rural people by providing the facilities and subsidies to enhance their livelihood.

Keywords: Palmyra palm, Value-addition, Livelihood, Economy

Introduction

The palmyra tree, also called "Borassus flabellifer," is a tall, swinging tree. The Greek term "Borassus" represents "the leathery covering of the fruit," while "flabellifer" refers to fan-bearer. It is also referred to as Taad or Tal in Hindi, Panai Maram in Tamil, and Palmyra palm tree, Toddy palm tree, Ice apple tree, or Wine palm tree in English. Asian Palmyra Palm, African Fan Palm, Borassus Palm, Brab Tree, Cambodian Palm, Doleib, Doub Palm, Great Fan Palm, Ice-Apple, Lontar Palm, Ron Palm, Sea Apple, Tal-Palm, Tala Palm, Toddy Palm, Sugar Palm, Wine Palm, Nugnu Palm, fan palm, sea apple, toddy, black palm, and brab are a few common names. The Palmyra palm tree, also known as Panai Maram, is highly respected in Tamil culture and is referred to as "KARPAGA VRIKSHAM" because humans use every part of it, including the fruit, trunk, leaves, and roots, for a variety of uses. The Palmyra palm is used to produce a variety of value-added products, including nungu, palm fruit jam, palm wine, palm sprouts, and neera sap. Its wood is used to make a variety of handcrafted goods, including items made of wood, leaves, coir, and other materials. It generates international revenue in addition to having a strong domestic and export market.

Areas of Palmyra cultivation

It is an indigenous species of tropical palm tree that grows naturally in several parts of East Africa, Indonesia, Malaysia, the Philippines, Sri Lanka, and India. Of which, South-East Asia and the Indian subcontinent are the most commonly grown places. It is widely cultivated from western India, throughout Indo-China, the smaller Indonesian Sunda Islands, and portions of Socotra, Sri Lanka, China South-Central, Jawa, Bangladesh, Myanmar, Sulawesi, Thailand, Laos, Malaya, Vietnam, and Cambodia. Palmyra tree has been designated as the state tree of Tamil Nadu since 1978. It is also found all throughout the west coast of India, as well as in Orissa, Bengal, Kerala, Andhra Pradesh, and Bihar. Veilmuthu (2020) reports that Tamil Nadu (51 million) accounts for 60% of the world's Palmyra population, which is

estimated to be 85.9 million in India. Tamil Nadu has the most percentage, with 51.9 million trees, with Thoothukudi district standing first. It gives employment opportunities and additional revenue to the rural region residents.



Figure 1: Palmyra palm tree (*Borassus flabellifer*) Source: (Rao et al., 2022)

Scope of palmyra and value-added products

India is experiencing severe problems with food security as a result of its growing population, industrialization, and urbanisation. In order to make agriculture more resilient, it is imperative that new species be introduced into India's agricultural production system. Within this context, Palmyrah palms are underutilised crops that have drawn less attention from agricultural researchers. This is likely due to the palm's slow growth, which is primarily found in wild states, despite producing a good amount of fresh produce (such as palm neera and nungu) and value-added products with high nutritional value that could help address the issue of malnutrition in developing nations like India. Palmyrah palms may be made more widely known by adding value (such as jaggery and tuber flour), which generates cash and enables the poor and marginal farmers have more security over their food and means of subsistence.

Value addition in Palmyra

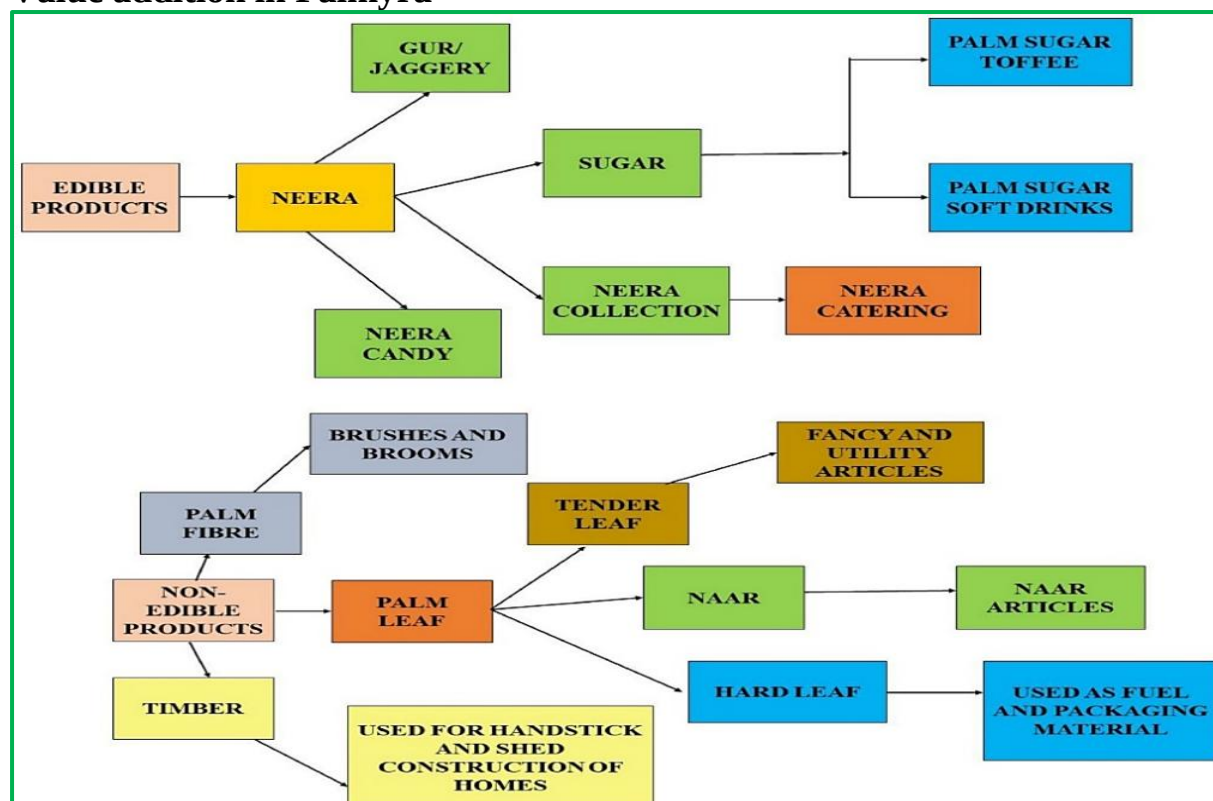


Figure 2: Palmyra palm and its products (Source: Upadhyaya A., et al. 2023.)

Neera Sap



Figure 3: Preparation of Toddy from palmyra sap (Source: Das S and Tamang JP., 2023)

Toddy tapping happens in the districts of Ramanathapuram, Tirunelveli, and Thoothukudi from April to August; in Kanyakumari from August to March; and in Salem and Dharmapuri from April to October. Neera is another name for palm nectar. It is a drink made from sap that is taken from the inflorescence of several types of toddy palms. Neera extraction is often done in the morning. It has a transparent, pleasant colour. Within a few hours following extraction, it is prone to spontaneous fermentation at room temperature. When Neera is fermented, it turns into a toddy. "Neera" (Padaneer in Tamil Nadu) is the name for unfermented sap. Neera sap is also known as toddy sap. It entails tapping and gathering juice that drips into hanging clay pots. Juice gathered before dawn is known as Neera, a light drink. Toddy tyres have more food calories than milk and are high in vitamin C, which makes them medicinally beneficial and helps to fight against cancer, diabetes and prevents hairfall.

Palm Wine

Palm wine is an alcoholic beverage which is made from sap of palm trunk. A small incision is made in the back of the palm about 15 cm from the top of the trunk. Sap is collected every day and sterilized. The sterilized unfermented sap shall have to be fermented with suitable stains of yeast to produce palm wine. The wine is clear white in colour and is very sweet in taste with a robust smell. It has the power to address cancer and improve eyesight. It supports the upkeep of better skin, hair, and nails. The risk of cardiovascular problems is decreased.



Figure 4: Palm wine (Source: Das S and Tamang JP., 2023)

Palm Jaggery

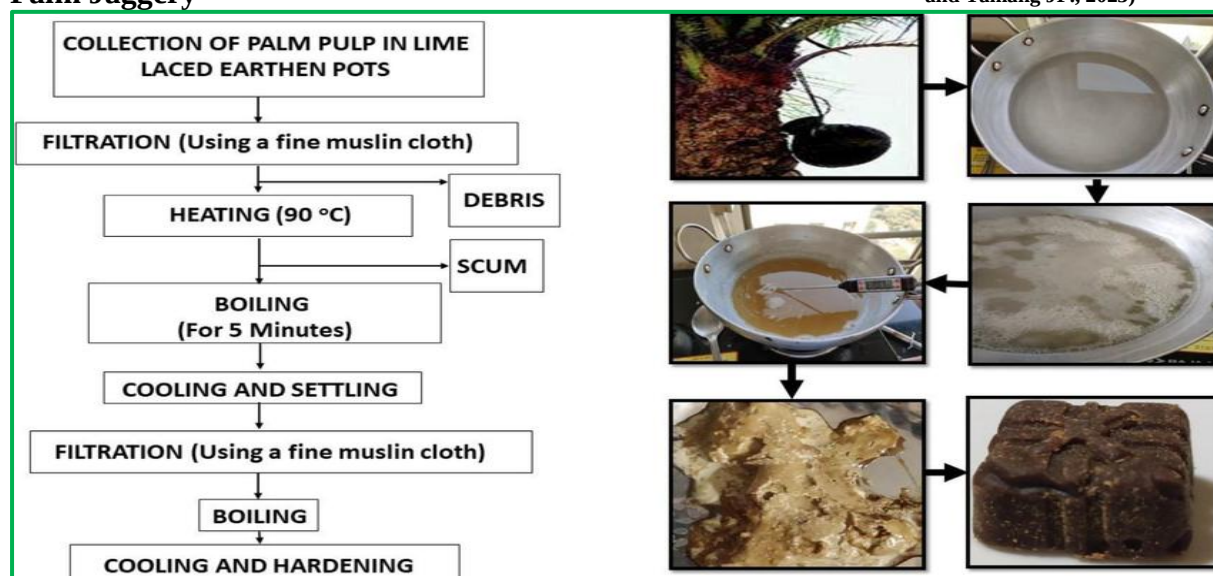


Figure 5: Palm jaggery making process (Source: Upadhyaya A., et al. 2023.)

Jaggery is used to describe a product made by heating or reusing juice extracted from Palmyra palms. An intermediate product obtained during the jaggery timber process is liquid jaggery. It's a significant sweetening ingredient that has been around since antiquity. In iron vats, the unfermented juice is cooked until it bubbles and then filtered. It is extracted from the boiling juice at a certain temperature in a semi-liquid state and may be stored for a while or longer. The quality, particularly the taste, of jaggery determines its price.

Palm Sugar

Neera may be used to make palmyra sugar by adding a little quantity of superphosphate. Following the creation of the crystalline sugar, it is dried and kept in a moisture-free environment in powder form. In addition to helping with cardiac problems, palm sugar also helps prevent osteoporosis. Minerals are the primary nutritional setup in win sugar. One percent of potassium is included in one tablespoon of win sugar. It supports the digestive system's proper functioning. It aids with weight reduction, colds, and dry cough. Water retention and bloating are lessened with palm sugar.



Figure 6: Palm sugar (Source: Vasuki, M., and Kumar, A. D., 2023)

Palm Fruit / Nungu

Anti-inflammatory and antioxidant properties are present in palm fruit. The fruit pulp relieves inflammatory skin conditions. It is used to treat worm infestation as well as nausea and vomiting. Palm fruits are an excellent alternative for any person on a diet or dealing with diabetes since they are high in vitamins and minerals. It's a great source of minerals like iron, zinc, potassium, calcium, phosphorus, and thiamine, as well as vitamins like B and C. Palm fruit is used to keep the body hydrated during the summer. Additionally, it restores the body's lost minerals and nutrients and keeps the body from being frazzled and experiencing painful urination. It works well for treating stomach affections and other digestive issues.



Figure 7: Palm Fruit (Source: Artnarong S., et al. 2016)

Palmyra Sprouts



Figure 8: Boiled and dried Palmyra sprouts (Source: Pc V., et al. 2017.)

The palmyra palm tree, also known as Panai Maram, yields edible tuber-like vegetables known as palmyra sprouts or panang kizhangu. The Palmyra palm seeds are used to cultivate the sprouts. For maximum quality, the palmyra sprout, is harvested before the first leaf appears. Panang kizhangu, also known as palmyra sprouts, are a famous seasonal snack food that is eaten either as roasted or boiled. It is offered in public spaces, street corner stores, textile stores, and outside of schools. The boiled palm sprouts can be made into a flour and stored for more than 12 months. It is mostly found in southern India in the late months of December to March. Palmyra sprouts provide a number of health advantages The crunchy kernel of the germinated seed, which tastes like a sweeter water chestnut, is extracted by

cracking open the hard shell of the seed. Palmyra sprouts are accessible exclusively during a specific season. It aids in lowering body temperature and wards off constipation. It helps in weight loss due to high fibre content. It boosts immunity and prevents gastrointestinal issues. Palmyra sprouts are beneficial for the uterus and helps to build bones.

Palm Gummy Jelly

Gummy jelly is a type of confection that contains a high sugar content, particularly sucrose and glucose syrup, along with one or more gelling agents, flavourings, colorings, and food acid (Burey, P., et al.2009). Palmyra palm fruit juice is used to make gummy jelly together with glucose syrup, sucrose, high methoxyl



Figure 9: Palm Jelly (Source: Sumonsiri, N., et al. 2021)

pectin, fructose, sodium citrate, water, and citric acid. The jelly and gummy market were

estimated to be worth USD 13.9 billion globally in 2018 and is projected to grow at a compound annual growth rate (CAGR) of 3.5% from 2019 to 2025 (Sumonsiri, N., et al. 2021). The number of vegans, rising consumer spending, and the expanding confectionery business have all contributed to the growth of this sector.

NON –EDIBLE PRODUCTS

Palmyra leaf

Strong structural integrity may be found in the flexible, delicate Palmyra leaf. Thus, elegant Olai (leaf) baskets are made out of it. With massive fan-shaped leaves that extend from the tip, they may reach heights of up to 100 feet. But the delicate young leaf, or kuruttu, is the most effective material to make Palmyra baskets. Naar is a far more costly raw material than delicate leaves since its products stay longer. After being picked in April and May, the palm leaves are allowed to dry for a day in the sun. The dried leaves are kept out of direct sunlight in dry storage areas.



Figure 10: Palmyra leaf



Figure 11: Process of Palmyra basket making (Source: Baral et al., 2020)



Figure 12: Palm fibre made products (Source: Veilmuthu, 2020)

Palm fibre products

Palmyra fibre is a naturally occurring fibre that is produced in southern and eastern India by treating the leaf sheaths of the palmyra palm. Because palmyra fibre is so durable and robust, it works well with semi-stiff sweeping brooms. Additionally, it works well for making scrub brushes.. Although it has good sweeping abilities, it is not robust and can warp when used, particularly in damp conditions. Bassine is highly appealing to brush manufacturers since it comes packaged and ready to use in a brush-making machine. It is utilised in less expensive cleaning brush mixes, warehouse brooms, and domestic brushes and brooms.

Palm-leaf manuscript



Figure:13 Bundle leaf manuscript



Secret symbol



Herbal medicine information

Source: Chu S., et al. 2023; Muruganandam S., et al. 2019.

During the 19th century, the Sethupathi monarchs of the Ramanathapuram area communicated information using palm leaf manuscripts. These have been maintained in the Ramalinga Vilasam Palace's archaeological museum. The most extensively exploited leaves are *Corypha taliera* Roxb, talipot, or fan palm, and *Borassus flabellifer* L., (palmyra palm). According to Chandramouli B., et al. 2020, one of them is *Corypha umbraculifera* L. leaves, which are commonly utilised in ancient texts. Dried palm leaves are used to create palm-leaf writings. From the fifth century BCE, palm leaves have been employed as writing materials throughout Southeast Asia and the Indian subcontinent. In order to create palm leaf manuscripts, the text was written with a knife pen on rectangular palm leaf sheets that had been cut and dried. After colouring the surface, the ink was left in the grooves that had been carved out. Usually, each sheet had a hole that a string could go through, and the sheets were bound together like a book by tying a thread through these holes. Colder, drier regions, such as Nepal, Tibet, and central Asia, are home to the oldest existing palm leaf Indian manuscripts. The majority of the palm leaf manuscript collection from south India, particularly from Tamil Nadu, focuses on the old Siddha medical system; personal astrology and mantras make up the second biggest portion.

Economy of Single Palm Per Year

The palmyra is present in most tropical nations as well as the drier parts of India, Sri Lanka, and Burma. The economy from single palm per year is given in Table 1.

Table 1: Economy of single palm per year

Raw material	Quantity	Finished product	Approximate value (in Rs.)
Neera / Juice	150 litres	Gur (20kg)	4000
Karuppatti / Jaggery / Gur	20-25 kg	-	-
Panankarkandu / Palm candy	16 kg	-	-
Matured leaves	10 kg / 8 Nos.	Mat 6 Number	100
Thumbu / Coir	11 kg	-	-
Eeark / Ekil (Leaf ribs)	2.25 kg	Brush 12 Number	70
Naar / Fiber	16-20 kg	Basket 1 Number	70
Viragu / Fire wood	10 kg	-	-

Source: Veilmuthu (2020)

Impact of palmyra on livelihood

The acquisition and processing of various products from various portions of palmyra palm trees is a major activity for a significant portion of the rural community in India. The underprivileged populations engaged in the production and processing of palm oil appear to have a good and feasible option for a sustainable means of subsistence. In addition, it has improved marketability, raised revenue, and preserved top germplasm. Refined and popularised post-harvest technology of palmyra is needed for value-added goods such neera, jaggery, palm sugar, candy, tuber-based products, pulp-based drinks, and spongy endosperm. Within the natural spectrum of Palmyra palm, a wide variety of value-added products are created for both domestic and commercial usage. Swathilekshmi, P. S. 2008, states that women's self-help groups have proven their ability to mobilise microcredit and engage in revenue-generating tasks like palmyra crafts and cottage businesses. Modern procedures must be used to prepare the value-added palmyra palm products to preserve them for use during the offseason and to increase their shelf life for improved distribution.

Actions taken to improve Tamil Nadu's palm population

The state government will distribute 10 lakh palm seedlings through the horticulture department as part of the palm growth campaign. (Commissioner of Agricultural Production). Additionally, a 50% subsidy for the establishment of companies producing value-added palm goods will be given to the designers of the best machine for climbing palm trees. Furthermore, through the Tamil Nadu Palm Products Development Board, the government will teach 250 palm farmers on the manufacturing of high-quality palm jaggery and palm

sugar and would offer equipment to toddy tappers at a 75% subsidy. Palm goods were produced and traded by about 1,000 primary Palm Jaggery Cooperative Societies, eight district Palmgur Marketing Cooperative Federations. In the Villupuram district of Madhavaram, Kadapakkam, Cuddalore, Mathur, Madurai, Manamadurai, Srivilliputhur, Thoothukudi, and Colachel, the federations cultivated palms across numerous acres. 3,000 litres of Neera and 200 kg of palm jaggery were routinely fermented at the centres. Palm sugar, palm oil, candies, preserved "nungu," palm fruit jam, palm chocolate types, and non-edible items including pieces made of palm leaves and fibre, brushes, and other handcrafted goods were also produced (Source: Deccan Chronicle, 2022).

Conclusion

Palmyra trees are hence essential to human existence. Various products are made from every part of the tree, and its health advantages are numerous. However, not everybody is aware of this particular tree. Hence it is necessary to create awareness campaigns for Palmyra products and provide facilities and subsidies to enhance the Palmyra growers' lot by the government. As a result, these employees are finding it difficult to do better due to which the economic standing of the nation is impacted. They may be able to eradicate poverty and create a great deal more innovative goods using these palm resources if the central and state governments provide them with incentives and bring awareness about the palmyra products.

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