



RESEARCH ARTICLE

BETELNUT: A TRADITIONAL BUT ECONOMICALLY PROFITABLE CROP AND SOURCE OF A REGULAR INCOME BY SUPPORTING SUSTAINABLE AGRICULTURE

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ABSTRACT

The areca nut or betel nut is the fruit of the areca palm (*Areca catechu*). The palm is originally native to the Philippines, but was carried widely through the tropics by the Austronesian migrations and trade since at least 1500 BCE due to its use in betel nut chewing. It is widespread in cultivation and is considered naturalized in much of the tropical Pacific (Melanesia and Micronesia), South Asia, Southeast Asia, and parts of east Africa. It is not to be confused with betel (*Piper betle*) leaves that are often used to wrap it. The practice of betel nut chewing, often together with other herbs as a stimulant drug, dates back thousands of years, and continues to the present day in many countries. Betel nut is a common stimulant in many Asian countries. However, very few studies investigate how chewing betel nut affects cognition. Betel nut seeds usually germinate in a minimum time of 6 weeks, and 1- to 2-year-old seedlings are planted into their permanent sites at a density of 1000–1500 palms per hectare. The palms usually begin to flower and fruit after 7 years. It takes 10–15 years to achieve maximum fruit production, which continues for 45–75 years. Use of inorganic fertilizers has, however, increased the production of betel nut in recent years. Around 10–20% of world's population uses betel nut. Recently, the trend has changed to chewing processed betel products known as pan-masalas and gutka. These are available in small, attractive, and convenient sachets for individual use, which contain a mixture of betel nut, cardamom, fennel, and slaked lime, and may also contain tobacco. The seed is separated from the outer layer of the fruit and may be used fresh, dried, boiled, baked, roasted or cured. The most common method of using betel nut is to slice it into thin strips and roll it in a betel leaf with slaked lime (powder) or crushed seashells. This leaf package is known as a betel quid, betel nut chew, betel chew, betel pan or betel paan (India). Betel quids may also contain tobacco and other additives such as cloves, cardamom, nutmeg, aniseed, coconut, sugar, syrups and fruit extracts, to enhance the flavour. Betel nut chewing is an important cultural practice in some regions in south and south-east Asia and the Asia Pacific. It has traditionally played an important role in social customs, religious practices and cultural rituals. The demand for areca nut and its products has been increasing steadily in India. Betelnut is a very profitable business with negligible investment. But, because of the government's negligence and lack of awareness, there is no proper market place to sell the products. Farmers also supply a part of the total production to the other parts of India. Betelnut growers face several problems, such as animal attack, and different types of diseases. These problems can be resolved by through proper awareness camps and training by different NGOs. Maximum numbers of betelnut growers are small growers. The majority of the farmers don't have the proper knowledge of marketing, and on average. But, nowadays, they earn some extra income by cultivating some mix cropping and selling betelnut plant leaves.

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INTRODUCTION

Betel nut, also known as arecanut or supari, is a significant crop in India, primarily cultivated in states like Karnataka, Kerala, and Assam. These three states contribute to over 85% of India's betel nut production. While these are the major producing regions, betel nut is also grown in other states including Meghalaya, Tamil Nadu, and West Bengal, though in

smaller quantities. Areca nut production in India is dominant in the coastal region within 400 kilometres from the coast line, and also in some other non-coastal states of India. Areca nut (*Areca catechu*), a tropical crop, is popularly known as betel nut, as its common usage in the country is for mastication with betel leaves. It is a palm tree species under the family of Arecaceae. It has commercial and economic importance not only in India but also in China and Southeast Asia. The

arecanut palm is the source of common chewing nut, popularly known as betel nut or Supari. In India it is extensively used by large sections of people and is very much linked with religious practices. India is the largest producer of arecanut and at the same time largest consumer also. Major states cultivating this crop are Karnataka (40%), Kerala (25%), Assam (20%), Tamil Nadu, Meghalaya and West Bengal. Arecanut is the major plantation crop of coastal and southern districts of the country under assured irrigation facility. The ever increasing demand for areca products like paan, supari and gutkha has led to continuous increase in arecanut prices worldwide. The processing methods, maturity and consumer preferences influence the types of arecanut products prepared. Around 7.7 lakh hectares of land are used for betel nut cultivation in India, with an annual production of 14 lakh tonnes and a yield of 1.8 tonnes per hectare (2021–2022). Betel nut is a seed of the *Areca Catechu* tree, which is cultivated in the tropical Pacific Islands and parts of Asia and Africa. Its use is widely prevalent throughout the world. Medical use of betel nut is limited, while scientific evidence reveals its various health hazards. Research has proved that regular use of betel nut is associated with different types of cancers, systemic illnesses, and various other diseases. In addition, use of betel nut is also linked to health emergencies, toxicities, and drug interactions.

HISTORY: -Areca nut is not a native crop of India. It is generally believed to be native to Malaysia or Philippines where it is grown in many varieties. It is a tropical crop which grows from West Indies to the East Coast of Africa, and in Bangladesh, China, Sri Lanka and Malaya. The practice of chewing the areca nuts is attributed to Vietnam and Malaysia. It was from Southeast Asia that the crop spread to Asia and India where it is cultivated as a cash crop. It is conjectured that ancient Indian literature provide information on betel nut and its mastication. The Indian Ayurveda texts also refer to the areca nuts as a traditional medicine. Its use in India is also noted from the pre-vedic period and was described by the word taamboola in ancient Indian civilization. It is extensively used in Hindu religious rites of birth, marriage, nuptial and is also offered to guests as a mark of hospitality. It is offered to gods in veneration in the form of taamboola, which consists of one areca nut placed over two betel leaves. Areca nut is extensively used as a masticator in south and southeast Asian countries, chewed with or without betel leaves. However, in India it has a special ethno-religious importance.

DISTRIBUTION

Karnataka is the largest producer of supari trees in India, followed by Kerala and Assam. In Karnataka, around 2.15 lakh hectares are under areca nut cultivation. The average size of areca nut (betel nut) gardens varies across regions. The Uttara Kannada District of Karnataka is the state's largest producer of betel nuts. These two states account for more than 80% of India's betel nut production. Native to South and Southeast Asia, Betel nut is widely cultivated in Sri-Lanka, India, Indonesia, Bangladesh, and the Philippines. Betel Nut prefers to grow in tropical and subtropical regions, as it is not cold tolerant. It is a close relative to the coconut plant and belongs to the palm family. It can grow up to a staggering height of 50-70 feet and features a slender bark, edible medium-sized dark green leaves, and single-seed fibrous fruit that later produces nuts when harvested and processed. Betelnut cultivation and consumption are also prevalent in other parts of Southeast Asia, such as Taiwan, Bangladesh, and other parts of Asia. Globally

it is primarily grown in India, Bangladesh, China, Indonesia and Myanmar. India leads the production followed by China and Bangladesh. India is the highest producer of arecanut with a production of around 3.3 lakh tonnes and a total acreage under cultivation of 2.64 lakh hectares, with Karnataka and Kerala accounting for nearly 72 per cent of the total production. Over six million people are engaged in arecanut cultivation, processing and trade. More than 85 per cent of the area under cultivation is made up of small and marginal holdings. Among the two varieties white nuts have a share of 60 per cent. India is also the largest consumer with around 3.2 lakh tonnes.

USES

- Areca nut husk is used to make many industrial products such as hardboard, insulation wool, cushions, paper, paper board and activated carbon.
- Areca leaf sheaths are used to make ply-boards.
- Other miscellaneous uses of leaf sheath are to make caps, eating bowls, vessels to keep palm wine, and artifacts.
- In the past, plantation farmers practiced inter-cropping to make themselves safe economically, as the gestation period of the areca nut plant before it started yielding nuts was very long.
- Areca nut and the plant as a whole is used widely in India and South Asia as: a masticator for chewing purposes, vegetable, medicine, stimulant, timber, fuel wood, clothing, wrapping, lubricant, tannin and so forth.
- The nut is chewed with the betel leaf as it has a stimulating effect.

CHEMICAL COMPOSITION

The chemical composition of areca nut comprises 14 to 15% of fat, polyphenols, tannins, alkaloids, polysaccharides, a small amount of protein, and vitamin B6 and vitamin C. The fat, which is extracted by using organic solvents, is made up of mastic acid and its byproducts. The fat is mixed in a certain proportion with cocoa butter or coconut oil, which is then used to make confectioneries and duplicate dairy products. The polyphenol (tannins) content varies from 38 to 47% in tender nuts and 15 to 22% in ripe nuts. Tannin, which is extracted from the nut, is used in foods as natural colouring agent, and also in the leather industry. Other minor constituents in the areca nut alkaloids, in terms of the total weight of the nut, is about 1.6%, which are comprise arecoline, arecolodine, arecaidine, guvacine, isoguvacine, and govacolidine; the pharmacological and other uses of these alkaloids are as "antihelminthic, ophthalmic, antibacterial, antidiabetic. The chemical composition of the areca husk consists of 18.75% furaldehyde which when distilled produces 5.5% furfural; it also yields xylitol.

Benefits of Betel Nut Tree

There are numerous benefits of betel nut trees. The following are the benefits of the betelnut

- **Nutritional benefits:** The nuts from the areca nut tree are good protein sources and other nurturing nutrients. It is used as a dietary source in many parts of the country.
- **Environmental benefits:** The plant also has environmental benefits; it helps in reforestation and land rehabilitation projects.

- **Health benefits:** Betel nut has astringent properties that help reduce bacteria in the mouth and prevent tooth decay. It helps keep oral health in check.
- **Economic benefits:** In India, many people do farming of betel nuts, which provides a source of income to them.
- **Stimulation:** A small amount of caffeine in the plant can help increase alertness and focus.
- **Helps reduce anxiety:** The nut has mild sedative properties that help reduce anxiety.
- It is the fourth most widely used addictive substance in the world, after caffeine, nicotine, and alcohol. Its use is also becoming increasingly frequent among youth, where it may serve as a gateway to tobacco use.
- People chew it for stress reduction, for a feeling of well-being, and for heightened awareness. It contains several psychoactive compounds. Arecoline, the principal alkaloid in betel nut, acts as a stimulant of the nervous system, and increases the levels of noradrenaline and acetylcholine. This leads to subjective effects of increased well-being, alertness, and stamina.
- Arecaidine, another active ingredient, may have anxiolytic properties through inhibition of gamma-amino butyric acid reuptake. These properties mean that there is a strong potential for the abuse of and dependence on the betel nut.
- Betel nut chewing may confer protection against dental caries. Researchers have reported a lower prevalence of dental caries among betel nut chewers than in non-chewers.
- The cariostatic properties of betel nut are not well known, but it has been suggested that the betel stain, which often coats the surface of the teeth, may act as a protective varnish. In vitro, evidence has suggested that the tannin content of areca may have antimicrobial properties, and this may contribute to the cariostatic role of areca. Moreover, the pH in the oral cavity might be increased by the process of chewing, leading to production of copious amounts of saliva in the mouth; this may act as a buffer against acid formed in plaque on teeth.
- Among South Asians, betel nut is thought to be good for health, and it is used as a traditional Ayurvedic medicine. It is used as a mouth freshener after meals, a taste enhancer, a purgative, and to help digestion.
- Some people use it for parasitic intestinal infections, impotence, and gynecological problems.
- It is also used among the lower socio-economic classes, to avoid boredom and to suppress hunger.
- Betel nut extract may improve speech, bladder control, and muscle strength after cerebrovascular accidents or stroke. Literature also suggests improvement in symptoms of schizophrenia.
- Betel nut chewers believe that it improves digestion.
- Some research also reports that betel nut chewing may reduce the risk of anemia in pregnant women.
- It is also used to prevent morning sickness and against unpleasant odors during pregnancy.
- Consumed in both dried and fresh form, Betel nut can be served raw, boiled, or roasted. It possesses a warm-spicy taste and consists of essential nutrients like arecoline, arecaidine, choline, gallic fatty acid, and tannins.
- It helps in preventing oral cavities.
- Improves focus by increasing concentration levels.
- Aids in curing indigestion.

NUTRITIVE VALUE OF ARECANUT:- Nutrients
Quantity per 100g Energy 249(Kcal) Moisture 31.3(g) Protein

4.9 (g) Fat 4.4 (g) Ash 1.0(g) Crude fibre 11.2(g) Carbohydrate 47.2 (g) Calcium 50 (mg) Phosphorous 130 (mg) Iron 1.5(mg)

Health Benefits and Nutritional Importance: Arecanut has been found to possess the following properties. • Prevents oral cavities, dry mouth, gum infection • Reduce swelling in gums • Improve digestion • Analgesic • Anti-inflammatory • Wound healing property • In the metabolic system as a digestive and carminative • Anti-diabetic • Used against certain skin diseases • Used as aphrodisiac • Improves eyesight when used as Thamboolaseva • Helps in relieving asthma

PROFITABLE ENTERPRISE:-Why betel nut can be a profitable enterprise:

High Demand

- Betel nut is a widely consumed product in various parts of the world, especially in Asia.
- It's a key ingredient in paan, a traditional chewing product enjoyed by many.
- There's also demand for betel nut in religious ceremonies and as a medicine.

Profitable Cultivation and Processing

- **Cultivation:-**Betel nut trees can yield for many years with proper care, and the crop can be quite lucrative, as evidenced by the high prices and income generated by farmers.
- **Processing:-**Betel nuts can be processed into various forms, including supari (sliced or chopped betel nuts) and pan masala (betel nut mixed with other ingredients), which can be sold at a higher price.
- **Minimal Investment:-**Some businesses can be started with minimal investment, such as a home-based betel nut cutting operation.

Growing Market

- **Export:-**India is a major exporter of betel nuts, with significant export volumes and value.
- **Domestic Demand:-**The domestic market for betel nut products is also robust, especially in regions where paan is popular.

Opportunities for Profit

- **Cultivation:-**Farmers can generate income from betel nut cultivation, with potential for high yields and prices.
- **Processing:-**Betel nut processing can offer opportunities for adding value and selling processed products at a higher margin.
- **Small-Scale Businesses:-**Entrepreneurs can start small-scale businesses like supari cutting, which can generate a good income.

Regional Variations

- **India:** India is a major producer and exporter of betel nuts.
- **Other Regions:** Betel nut cultivation and consumption are also prevalent in other parts of Southeast Asia, such as Taiwan, Bangladesh, and other parts of Asia.

Betel nut offers a range of opportunities for profit, from cultivation to processing and small-scale businesses. The key to success lies in understanding the market, finding a suitable production method, and ensuring quality control to meet the demand for this popular product. Start a Betel Nut (Supari) Processing Business. Profitable Arecanut (Betelnut) Processing Industry. Betel nut is a combination of three ingredients. People roll small pieces of the nut from Areca catechu, more commonly called betel palm, in a leaf from the Piper betel vine, then add powdered slaked lime or limestone paste, and chew it.

The substance is popular in certain parts of the world, primarily Asia and Africa. Some components of betel nut have pharmacological properties, but little evidence supports its use for any therapeutic purpose. Areca nut is widely used mainly in the Asian and South East Asian population. It is normal that after having food in India people use areca nut along with the betel leaves as a digester in small quantities.

IS BETEL NUT CONSUMED WORLDWIDE?: It is believed that 600 million individuals chew betel nuts or 10% of the world's population. In several Asian nations, such as Bangladesh, Myanmar, Cambodia, Thailand, the Philippines, Laos, Vietnam, and India, chewing betel nuts is even a cultural practice. In 2023, the global betel nut market is expected to be worth US\$ 867.4 million and expand at a compound annual growth rate (CAGR) of 7.9%.

The share of betel nut imports into India is approximately 22%, while the country's part of exports to the global market is less than 5%. Increased awareness of the health benefits of betel nuts and the growing acceptability of smokeless tobacco products are the primary drivers of the market's growth.

BETEL NUT EXPORT FROM INDIA: 2023-24

Description	Details
Betel Nut Export (Shipments)	369 shipments
Betel Nut Export Data (Metric Tons)	10,636.87 MT
Betel Leaf Export (Metric Tons)	1,620.06 MT
Betel nut export from India (INR)	Rs. 400.13 Crore
Betel or Areca nut export from India (USD)	48.35 Million USD
Growth Rate (Over Previous Year)	-28% (decline over previous 12 months)
Key Importers	UAE, Vietnam, Bhutan, Nepal, Malaysia
Types of betel Nuts Exported	Red betel Nuts (boiled & husked) White betel Nuts (sun-dried)

Betel nut export data shows that between March 2023 and February 2024 (TTM), India exported 369 shipments of betel nuts to 100 buyers. Based on betel nut export data, betel nut export from India was around US\$ 48.35 million in 2023–24. At the same time, the nation has exported 1,620.06 metric tonnes of Betel leaves to the world, worth US\$ 5.18 million. 2022-23, India exported more than ten thousand metric tonnes of betel nuts.

However, in 2016, betel nut exporters in India exported more than ten thousand metric tonnes of betel nuts, which is slightly more than twice as much as in 2022–23. Red and white betel nuts are the two types of betel nuts exported from India. While the red type is prepared by boiling green betel nuts and husking them, the white variety is made by sun-drying completely mature nuts. India exports most of its betel nuts to

the United Arab Emirates, Vietnam, Bhutan, Nepal and Malaysia.

MAJOR BETEL NUT EXPORTERS IN INDIA

Here is the list of India's leading exporters of betel nuts:

- Dharsini Exports
- Khodiyar Overseas Trade
- Prestige Exim
- Megh Overseas Private Limited
- Gangway & Export India
- JGB Agrofresh Private Limited
- Omaha Health Organisation Private Limited
- Tradewise Indian Xporter Private Limited
- Saad Traders
- Shipkia Exports

STEPS TO START YOUR HOME-BASED SUPARI CUTTING BUSINESS

Starting a supari cutting business from home is easier than you might think. The Following are the steps to start a home-based Supari cutting business:

Market Research:-Start by understanding the demand for supari in your locality. Identify your target customers, such as local paan shops, grocery stores, and individual consumers. Research your competitors to determine the types of supari products they offer and their pricing strategies.

Business Plan:-Make a business plan outlining your objectives, target market, product range, pricing, marketing strategies, and financial projections. A well-structured plan will serve as a roadmap for your business and help in securing any necessary funding.

Procuring Raw Materials:-Source good quality raw betel nuts from reliable suppliers. Purchasing in bulk from wholesale markets can reduce costs. Additionally, acquire various flavoring agents if you plan to produce scented supari varieties like sandal, cardamom, saffron, or menthol.

Equipment and Setup:-Invest in a supari cutting machine suitable for small-scale production. Pragati Gruh Udyog offers affordable, easy-to-use machines that are perfect for home-based businesses. These machines can cut up to 15–20 kg of supari per day, saving you time and effort. Ensure your workspace is clean, well-ventilated, and equipped with necessary utilities like electricity and water.

Production Process:- The typical steps in supari processing include:

- **Soaking supari 8-10 hours:** The supari (betel nut) is soaked in water for 8-10 hours to soften it for easier slicing.
- **Cutting chips slice:** After soaking, the supari is sliced into thin, uniform chips using a sharp knife or machine.
- **Drying ready material:** The sliced supari chips are dried to remove moisture and preserved for long-term storage.
- **Packaging:** Once dried, the supari chips are packaged for sale or distribution, ensuring they remain fresh and hygienic.



Broken Nuts

Marketing and Sales:-Develop a marketing strategy to promote your products. Some effective approaches include:

- **Local Retailers:** Supply your products to local paan shops, grocery stores, and supermarkets.
- **Online Platforms:** Leverage e-commerce platforms and social media to reach a broader audience.
- **Branding:** Create a unique brand identity with appealing packaging and consistent quality to build customer loyalty.

Financial Management: -Keep detailed records of your expenses and revenues. Regularly analyze your financial statements to monitor profitability and identify areas for improvement.

Profitability and Growth Prospects: -Starting a supari cutting business from home involves moderate initial investment, primarily for machinery and raw materials. With efficient operations and effective marketing, achieving a monthly income of ₹30,000 is attainable. As your business grows, consider diversifying your product range or scaling up production to increase profitability. A home-based supari cutting business offers a promising opportunity to generate a steady income. By following the outlined steps and maintaining a focus on quality and customer satisfaction, you can establish a successful venture in this field.

BAD EFFECTS

- Medical use of betel nut is limited.
- Regular use of betel nut is a strong risk factor for cancers of the mouth, pharynx, esophagus, and stomach, and also increases risk of prostate, cervix, and lung cancer.
- Prolonged use of betel nut is associated with diabetes, hypertension, and cardiovascular diseases, and is also associated with increased all-cause mortality.
- The use of betel nut during pregnancy is discouraged due to unwanted effects on the fetus.
- Betel nut has serious interactions with a large number of herbs, drugs, and medications.
- It is the fourth most widely used addictive substance in the world, after caffeine, nicotine, and alcohol.
- High doses of its usage can cause hypercalcemia, hypokalemia, and metabolic alkalosis.

- Chewing betel nut on a habitual basis is known to be deleterious to human health, and has significant adverse effects. Use of betel nut in any form is not safe for health.
- Even when consumed without tobacco or lime, betel nut may have potentially harmful effects on the oral cavity.
- The regular chewing of betel nut has major effects on the teeth leading to severe wear and tear of incisal and occlusal tooth surfaces, mainly the enamel covering. The loss of enamel may also result in dentinal sensitivity, and root fractures have been demonstrated among regular betel nut chewers.
- Betel nut products, even those without tobacco, are associated with an increased risk for the development of oral malignancy (oral squamous cell carcinoma) and its precursor leukoplakia.
- Betel nut chewing is linked not only to the development of cancers of the oral cavity and head and neck, but also with cancers of the esophagus, stomach, prostate, cervix, lungs, and sweat glands.
- Betel nut chewing is also associated with cirrhosis and malignancy of the liver.
- Betel nut chewing is independently associated with greater cardiovascular disease and all-cause mortality after control for possible confounders.
- Betel nut chewing also causes bronchoconstriction, and may aggravate asthma.
- The effects of chronic betel nut usage in man are at least as diverse as those of smoking, and the habit increases the risk of ill health many times.
- Betel nut use may lead to increased production of body secretions, including saliva, tears, and sweat.
- Intake of betel nut in the form of pan masala and gutka correlates with chronic urticaria.
- Use of betel nut during pregnancy can increase the risk of birth defects, spontaneous abortions, and birth-weight reduction.
- As betel nut may also alter blood sugar levels, careful blood sugar monitoring is imperative among people with diabetes who are on oral hypoglycemic drugs or using insulin.
- Betel nut may reduce the beneficial effects of thiamine (vitamin B1).

Types of Betel Nut Tree

Following are several areca nut palm trees

- **Areca macro calyx or Highland betel nut:** The most common areca nut palm is the Highland betel nut grown in India and other South Asian countries. The nuts in this plant are small and round with a bright red outer cover.
- **Areca catechu:** Another commonly grown betel tree in India and Bangladesh is Areca catechu. The outer husk of this plant's fruit is yellow or brown, and its shape is oval.
- **Areca vestiaria:** Areca vestiaria is grown in the Philippines, producing large oval-shaped nuts.
- **Areca triandra:** Commonly found in Indonesia, Thailand, and Malaysia, - Areca triandra- produces yellow flowers and contains small round fruit.
- **Areca lutescens:** This variety of betel nut palm is native to Madagascar. The leaves of the plant resemble butterfly

wings. The tree's fruit is small in size and has yellow-coloured flowers.

CULTIVATION PROCEDURES: Varieties: -Mangala, Sumangala, Subamangala, Mohitnagar, Srimangala, Samruthi (Andaman), Hirehalli dwarf, VTLAH 1, 2 and Thirthahalli dwarf. Saigon, Kahikuchi Tall

Soil and climate: Arecanut is capable of growing in a variety of soils. It thrives best in well drained soils. Adequate protection from exposure to South-Western sun is essential to avoid sun-scorch. Quick growing shade trees have to be planted on the southern and western sides well in advance of planting seedlings. It is sensitive to moisture deficit and should be grown where adequate water facilities are available. Grows in a wide range of temperature ranging from minimum of 4°C to a maximum of 40°C. Altitude upto 1000 m above Msl. Rainfall – 750 – 4500 mm.

Season:-June – December is found to be the optimum.

Seeds and sowing:-For raising seedlings seed nuts from pre-marked and pre-potent mother palms of outstanding performance are selected and sown at a spacing of 5 - 6 cm apart in sand beds under partial shade with their stalk end pointing upwards. After the sprouts have produced two to three leaves, they are transplanted to a polythene bag 30 x 10 cm filled with forest soil and are allowed to grow for 12 to 18 months under partial shade. The seedlings can also be transplanted in secondary nursery beds with a spacing of 30 cm on either side. Periodical watering should be given.

Planting:-Dwarf and compact seedlings with more number of leaves should be selected. Seedlings of 1 - 2 years age are planted in pits of about 90 cm x 90 cm x 90 cm at a spacing of 2.75 m either way and covered with soil to the collar level and pressed around. Provide shade during summer months. Growing Banana or other crops in advance may also provide shade.

Irrigation:-Irrigate weekly once during November – February, once in 4 days during March – May. Flood irrigation 175 lit/ tree/ day. In drip irrigation 16 – 20 lit/ tree/ day.

Manuring:-Apply to each bearing palm (5 years and above) 10 - 15 kg of FYM or green leaf. 100:40:140 g of NPK/ tree/ year. To palms less than five years old, half of the above dose is recommended. Manures are applied during January - February after the North - East monsoon in a basin of 0.75-1.00 m radius around the tree to a depth of 20 - 30 cm.

Aftercultivation:-Weeding is done twice or thrice a year by spade digging. Wherever the land is sloppy, terracing has to be done to prevent soil erosion.

Intercropping:-Cocoa, black pepper, coffee, vanilla, cinnamon, clove and citrus

Plant protection

Pests

Mites: Mites can be controlled by spraying Dicofol 18.5 EC at 2.5 ml/lit.

Spindle bug:-Drenching spray with Methyl parathion 1.3 D @ 2.5 g/lit of water or Dimethoate @ 1.5 ml/lit.

Inflorescence caterpillars: Dust Methyl parathion 20 EC 2 ml/lit or WP @ 2.5 g in one litre of water.

Nematode: Soil application of *P. fluorescens* (Pfbv 22) and *B. subtilis* (Bbv 57) each @ g / vine was found to be effective in reducing the root knot and reniform nematode population in black pepper.

Diseases: Bud rot or Mahali disease:-Infected tissues of the bud should be scooped off and treated with 10 % Bordeaux paste. Destruction and removal of seed palms and also bunches affected by Mahali and drenching crowns of surrounding healthy palms with 1 % Bordeaux mixture would help in minimizing the incidence of the disease.

Foot rot or Anabe:-Affected palms have to be isolated by digging trenches all round. The severely affected palms should be cut and destroyed. The stumps should be pulled out by digging and the drainage improved. Soil application of neem cake @ 2 kg / palm / year followed by root feeding with 125 ml of 1.5 % (15 ml/litre of water) Tridemorph at 3 months interval or Soil drenching of Bordeaux mixture (1%).

Stem breaking:-Wrap up of the green portion of the stem which is exposed to the South-West sun to protect against sun-scorch.

Yellow Leaf Disease

- Application of balanced nutrients with additional quantity of super phosphate
- Apply 1 kg of lime/tree/year
- Apply organic manures @ 12 kg/ tree/year.

Leaf spot:-Foliar spray with Bordeaux mixture 1 % or 0.2 % Dithane M 45

Nut crack:-Spray Borax 2 g/lit with proper water management

Harvest:-The bearing starts after 5 years of planting. Nuts are harvested when they are three quarters ripe. The number of harvests will vary from three to five in one year depending upon the season and place of cultivation.

Yield:-An average of about 1250 kg/ha can be obtained.

CONSTRAINTS: Betel nut is a seed of the *Areca catechu* tree, cultivated in tropical humid regions. Up to 20% of the world's population uses betel nut—more so in South and Southeast Asia but medical use of betel nut is limited. It is the fourth most widely used addictive substance in the world, after caffeine, nicotine, and alcohol. People chew it for stress reduction, for a feeling of well-being, and for heightened awareness. It contains several psychoactive compounds. Arecoline, the principal alkaloid in betel nut, acts as a stimulant of the nervous system and increases the levels of noradrenaline and acetylcholine. This leads to subjective effects of increased well-being, alertness, and stamina. The preferred route of intake is chewing, which leads to rapid absorption of these alkaloids through the buccal mucosa. It has also been suggested that betel nut chewing may confer protection against dental caries. The cariostatic properties of betel nut are not well known, but it has been suggested that the betel stain, which

often coats the surface of the teeth, may act as a protective varnish. In vitro evidence has suggested that the tannin content of areca may have antimicrobial properties, and this may contribute to the cariostatic role of areca. Some evidence suggests that betel nut extract may improve speech, bladder control, and muscle strength after cerebrovascular accidents or stroke. However, betel nut chewing can produce significant cholinergic, neurological, cardiovascular, and gastrointestinal manifestations. High doses of its usage can cause hypercalcemia, hypokalemia, and metabolic alkalosis.

PROBLEM ASSOCIATED WITH PRODUCTION

1. COST OF CULTIVATION: - In Today's environment to start areca cultivation one should have patience, commitment, perseverance, team of labors and ability to invest lakhs of rupees. Preparation of land layout for planting, fencing, digging and opening of drains, digging of pits for areca planting, cost of areca seeds, fertilizers, irrigation materials and expense of plant protection measures, mulching and shading expenses, crop operations, cleaning of drains, application of fresh soil and management of intercrops are the major components of cost involved in the cultivation of areca nut. Now a days areca cultivation by buying plain land calls for substantial investment.



PESTS CAUSING MAJOR CROP LOSS: -Areca nut cultivation in the study area is subject to disturbance by several insects and non-insects. These insects could infest all parts of the areca palm from the root to areca fruits. The major pests causing considerable crop loss to the farmers will comprise of Mites, Spindle bugs, Caterpillars and Root grubbers. These pests are either seasonal or persistent with the crop. Non insect pests cause fall of Inflorescence and leaves. Apart from this, other minor Nursery pests, trunk feeders, Leaf feeders and tender nut feeders are considered to be faltering chunk in the course of production.

DISEASES: -Areca nut palm is reported to be affected by a number of diseases during different stages of its growth and development. 'Around 20 types of diseases causing varying degrees of damages to the tree have been discovered and identified in India'. However, the following major nine types of diseases are reported to be responsible for the downfall in the process of production activity. (1) Yellow leaf diseases (YLD) or 'Chandi roga'. (2) Mahali ('Kole roga') (3) 'Anabe roga' or mushroom bottom rot (4) Inflorescence death and batten flaking (5) flower or bud decompose (6) The spring or 'Hirimundige' (7) Sun scorch or Stem breaking (8) Nut splitting (front and back) (9) Fungal infection.

WATER AND IRRIGATION DIFFICULTIES:- Still, in recent years farmers are facing water problem here and there due to lack of channelized water supply system and erratic rain effect. Moreover, reduced level of ground water has added fuel to the burning issues. Though there are many ponds, lakes, water reservoirs in the high land area, they are with full of mud, due to improper maintenance, negative attitude shown by authorities concerned or organized body of farmers and

individual farmers to clean up the water sources for its utilization. Farmers need to invest lakhs of rupees to irrigate land.

EFFECTS OF DEFORESTATION, DWINDLING AND DWINING OF GREEN FORESTS: Finally this deforestation effect has made deep impact on areca farming. It could be seen from the attack of wild animals and birds, crowd in the areca garden, reduction in water supply, increased temperature, decreasing rain etc., Besides this providing green leaf manure has become costly for the farmers, it has badly damaged the yield.

LACK OF LABOUR SAVING APPLIANCES :- Till today, areca cultivation has maintained its unique nature of labor intensive system. Problems of labor has created the urgent need and necessity of labor saving appliances. However, these are not available to the desired extent, which has posed problems over production.

STABILITY IN PRODUCTION: Quantum of yield differs from place to place. On the contrary, yield rate is not stable due to climate variations, rain, diseases and pests. So that growers will have to face the situation of instability in the production. This trend will have impinging impact on the socio-economic development of the growers.

DIFFICULTY IN GROWING INTERCROPS: Over the period of decades, traditional popularity in producing intercrops like Pepper, Cardamom, Banana, Betel vine, and coconut. But, since fifteen years it became difficult to grow these intercrops due to various diseases, erratic rain behavior, disturbance caused by the animals, birds attack etc. Therefore, failure of inter crops have accelerated the problems of areca gardeners having the adverse effect over yield on the one hand and threatening economic life on the other.

CROP MANAGEMENT AND PROTECTION: Unlike other agricultural crops areca is to be maintained properly to enjoy the benefits of better yielding. It has to be protected at all the stages before, during and after the harvest from the natural calamities, pest and other diseases, animals, labor, technical, theft etc., Hence thought to be hard to grow and maintain.

MAINTENANCE TIPS: Betel nut or areca nut tree is found in tropical areas like rainforests in southeast Asia. If you wish to grow the tree in your house garden, follow the instructions:-

- **Location:** The location of the betel nut tree should have good soil drainage, sunlight and partial sunlight.
- **Hole size for the plant:** A betel plant should be planted in a twice-sized hole, and the depth should be as deep as the root.
- **Watering:** The plant should be watered regularly, and the soil should be moist and not soggy. If appropriate water is not poured, then it can cause the leaves to turn yellow and dry them up.
- **Fertiliser:** Every two months, a balanced fertiliser should be used. This will help grow the tree.
- **Prune off damages:** To maintain the healthy growth of betel nut trees, prune off any dead or damaged parts.
- **Soil:** Soil mix should include peat moss, perlite, and coconut coir. The soil should be slightly acidic, with a pH of around 6.0 to 6.5.

- **Light:** The Areca nut tree prefers direct sunlight. Even if you plant it inside the house, ensure it is in direct sunlight.
- **Temperature:** Betel nut tree prefers warm and high humidity temperatures.
- **Cold temperature:** The Areca nut tree is not tolerant to frost, so protect it from freezing temperatures. If you live in a cold area, try keeping it indoors where the temperature is normal

Significance of Betel Nut in Hinduism:—In Hinduism, the betel nut holds utmost importance. It is believed that betel nut helps connect with divine gods and goddesses.

- Before starting a Havan, put paan with supari in Havan Kund
- Betel nut is offered to Lord Shiva during puja
- Supari helps in taking blessings from Lord Ganesha and Lakshmi
- Areca palm nut is used for Phulaish puja
- If we do not have an image of any god, we can use supari instead. It can symbolise Brahman, Varun dev, Indradev
- Offering betel nuts to god means removing negative energies from life.
- Supari is considered auspicious in Hindu weddings and festivals.
- Betel nut plays an important role in Sankalpas or visualisation

CONCLUSION

Betel nut offers a range of opportunities for profit, from cultivation to processing and small-scale businesses. The key to success lies in understanding the market, finding a suitable production method, and ensuring quality control to meet the demand for this popular product. Areca nut is majorly influenced by weather conditions in the production area, government policies, the growth of consumer industries, government policies for consumer industries and a few others. The regular consumption of areca nut causes severe diseases such as throat cancer and mouth cancer. Due to a significant number of people affected by the consumption of areca nut, the Indian and several governments have posed various regulations over the areca nut production and consumer industries. This fact has restrained the market for areca nut. Also, the increasing awareness among people regarding healthy life style and severe effects of areca nut have resulted into a barrier for areca nut market. As the pre-bearing age of the palm trees is between 5 to 8 years, and only 5% of them result into seed set, the cultivation of areca nut consumes a lot of time. The time required for cultivation of areca nut and required environmental conditions such as minimum 70% humidity restrains the market at the supplier end. The demand for areca nut and its products has been increasing steadily in India. Betelnut is a very profitable business with negligible investment. But, because of the government's negligence and lack of awareness, there is no proper market place to sell the products. Farmers also supply a part of the total production to the other parts of India. Betelnut growers face several problems, such as animal attack, and different types of diseases. These problems can be resolved by through proper awareness camps and training by different NGOs.

Maximum numbers of betelnut growers are small growers. The majority of the farmers don't have the proper knowledge of marketing, and on average. But, nowadays, they earn some extra income by cultivating some mix cropping and selling betelnut plant leaves. We all are familiar with betelnut plant. Betelnut has high demand in national and international market. By cultivating this plant, farmers can earn. But, well developed market for selling betelnut is not sufficient. It is necessary, before cultivating of this crop, they should know the market where to sell. Betelnut seed has many good effects and many bad effects. But, we will be interested on good effects of this plant. Regular consumption of betelnut seed mainly by chewing is the main problem of human health. Hence, regular consumption habit is to be stopped. Otherwise, the crop is beneficial and have many uses in Hindu religious activities & rituals. It is traditional crop. Only few person cultivate the crop commercially. But, majority of the farmers or people, in their home front, side or back grow few betelnut plants. Few of persons grow this crop for home decoration purpose, mainly two sides of home path/road or home boundaries for beautification mainly and economic aspects additionally. But this crop is economically profitable crop, hence farmers can reevaluate their plan of crop cultivation. Another aspect of this crop is the regular source of income for a home or individual and this crop in a year provides fruit 4-5 times depending on varieties and geographical position. This crop is very low space utilizing crop & supports intercropping & indirectly raise the income of farmers. For this crop cultivation, not so much fertilizers, not so much pesticides, not so much herbicides are required which obviously supports sustainable agriculture. Hence, farmers should be interested on this crop cultivation and in this respect extension agencies must play leading roles. In this regard, M.S. Swaminathan told, "We need a new vision for agriculture to spread happiness among farm and rural families."

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