ARECANUT PRODUCTION SCENARIO IN INDIA

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Arecanut (*Areca catechu* L.) is one of the commercial crops of India and finds a place in all religious, social and cultural functions in India, Arecanut is popular as a masticatory used either with betel leaves or as plain or as scented supari. Arecanut has uses in ayurvedic and veterinary medicines because of its several alkaloids, but its utilization in this manner is negligible on the whole. The habit of chewing arecanut is typical of the Indian sub-continent and its neighbourhood. Its demand in other parts of the world is chiefly from the section of the population who migrated originally from this sub-continent. It is also used in India in several socio-religious ceremonies. It is estimated that about 10 million people depend on arecanut industry, in different sectors like cultivation, production, processing and marketing for their livelihood in India. There are mainly two varieties in arecanut. They are called (1) Boiled *supari* (Red supari) and (2) Non-boiled *supari* (white *supari*). The boiled supari is mainly used in the manufacture of *Panmasala* and *Gutkha*, where white supari is used in the making of pan by panwalas.

Global Production Scenario

Arecanut is grown principally in the hot and humid regions of the world. According to Food and Agriculture Organization, Rome, the current production of arecanut in the world is about 12.7 5lakh tonnes from an area of 9.26 lakh hectares. India ranks first in both area (48%) and production (49%) of arecanut. Other countries which produce arecanut are Indonesia (16% in area and

Table 1. Country-wise area and production of arecanut 2012

Country	Area (ha)	Production (tonnes)	Productivity (kg/ha)
India*	441780	629670	1425
Bangladesh	184000	108000	587
Indonesia	149900	187000	1247
Myanmar	56500	122000	2159
China, Taiwan Province of	46000	135000	2935
Thailand	18000	35000	1944
Sri Lanka	15910	37700	2370
Bhutan	10000	10500	1050
Nepal	3459	9188	2656
Malaysia	358	672	1877
Maldives	7	10	1429
Kenya		112	
World total	**925914**	**1274852**	**1377**

Source: FAO data accessed on 11 Sept 2014

* DASD estimate for 2011-12

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15% in production), China (5% in area and 11% in production), Bangladesh (20% in area and 9% in production), Thailand (2% in area and 3% in production), Sri Lanka (2% in area and 3% in production).

Indian Production Scenario

As mentioned above, India is the largest Arecanut producing country in the world. In India, arecanut is popular as a masticatory used either with betel leaves or as plain or as scented *supari*. Arecanut cultivation is concentrated in South Western and North Eastern regions mainly in the states of Karnataka, Kerala, Assam, West Bengal, Meghalaya, Tamil Nadu, Maharashtra, Tripura etc. Although the production of arecanut is localised in a few states, the commercial product is widely distributed all over the country and is consumed by all classes of people.

India produces 6.21 lakh tonnes of Arecanut, valued at more than Rs 8000 crores, from an estimated area of 4.50 lakh ha. Karnataka, Kerala and Assam are the three major states producing arecanut. Karnataka is the largest producer of Arecanut in the country with 3.5 lakh tonnes production from an area of about 2.2 lakh ha. State-wise area, production and productivity of arecanut in the country are given below.

Arecanut production in the country has increased substantially during the last decade as

Table 2 . State-wise area, production and productivity of Arecanut in India

State	2012-13 (Revised)			2013-14 (provisional)		
	Area	Prodn.	Yield	Area	Prodn.	Yield
Andhra Pradesh	0.58	0.36	627	0.58	0.36	627
Assam	75.06	72.58	967	75.06	72.58	967
Goa	1.73	2.88	1668	1.74	2.90	1664
Karnataka	221.37	358.61	1620	217.48	348.77	1604
Kerala	101.78	118.23	1162	102.09	113.36	1110
Maharashtra	2.20	3.58	1626	2.20	3.58	1626
Meghalaya	16.06	23.03	1433	17.11	24.68	1443
Mizoram	7.57	4.32	570	7.57	4.32	570
Nagaland	0.22	0.12	535	0.22	0.12	535
Tamil Nadu	6.66	11.91	1789	6.06	13.20	2180
Tripura	4.70	9.92	2111	4.70	9.92	2111
West Bengal	11.39	21.16	1857	11.39	21.16	1857
Andaman & Nicobar Islands	4.23	5.88	1392	4.23	5.88	1392
Pondicherry	0.06	0.08	1250	0.06	0.08	1250
All India	**453.59**	**632.65**	**1395**	**450.47**	**620.91**	**1378**

shown in the table given below. Production of Arecanut, which stood at 403,100 tonnes from an estimated area of 340,900 ha during 2001-02, has increased to 715,000 tonnes from an estimated area of 430,800 ha during 2010-11. The attractive price prevalent during the period in between 1994-95 and 1999-2000 encouraged the farmers in Karnataka and Kerala to go in for new planting of arecanut. Further, it enthused the growers to adopt intensive cultivation methods resulting in higher productivity from the existing gardens. But during the last three years (2011-12 to 2012-13), the area under cultivation increased to 450,500 ha whereas the production of arecanut showed substantial decline of about one lakh tones by the year 2013-14. This reduction in production was mainly due to the severe incidence of diseases like yellow leaf disease and koleroga in some parts of Karnataka Kerala States.

At present, the major livelihood concerns of the arecanut farming community are increased import, limited export demand, violent price fluctuations, diseases like YLD (yellow leaf disease) and Koleroga, non-availability of viable technologies for value addition and alternative uses, increasing cost of production and the alleged health issues involving consumption of arecanut in the recent times have generated livelihood concerns to arecanut farming community of the country. Moreover, majority of the States in the country have banned the use of Gutkha, a product which is a combination of Arecanut with tobacco.

Table 3. Area and production of arecanut in India during the last ten years

Year	Area ('000 ha)	Production ('000 tonnes)
2001-02	340.9	403.1
2002-03	354.3	415.9
2003-04	365.0	439.1
2004-05	374.1	456.3
2005-06	380.7	482.4
2006-07	381.1	463.3
2007-08	388.6	491.3
2008-09	396.1	514.3
2009-10	413.4	528.8
2010-11	430.8	715.0
2011-12	441.8	629.6
2012-13	453.6	632.7
2013-14*	450.5	620.9

*provisional

Import of Arecanut

During fifties the arecanut production in the country was not sufficient to meet the internal requirement. This is reflected in the huge quantities that were imported during fifties. The quantity imported during those periods ranges from 18,364 tonnes to 50,600 tonnes. The imported arecanuts were in the form of betel nut whole, betel nut split etc. Thereafter the import gradually began to decline year after year due to the decision of the Government of India to restrict the import with a view to give incentive to the arecanut farmers. From 1974-75 to 1993-94 there was no import of arecanut into the country. Since 1994-95 India started importing arecanut due to the increase in domestic consumption to fill the gap in demand. The quantity of import varied from 545 tonnes to 10823 tonnes during the years 1994-95 to 1999-2000. From 1999-00 onwards import of arecanut in to the country registered a significant increase due to change in global scenario in the context of trade liberalization. During 2012-13, import of arecanut in the country reached at an all time high of 97,316 tonnes valued at Rs 589.79 crores. Major chunk of Arecanut import during 2013-14 was

from Bangladesh (55%) followed by Nepal (28%), Myanmar (7%), Sri Lanka (5%), Indonesia (3%).

Table 4. Import of arecanut in India

Year	Quantity (tonnes)	Value (Rsin lakhs)
2004-05	32124	4395.37
2005-06	53275	7228.10
2006-07	76678	11064.88
2007-08	21299	3574.89
2008-09	41797	9830.18
2009-10	39527	9440.74
2010-11	72697	24454.00
2011-12	71512	26354.00
2012-13	97316	58979.00

Source: DGCI&S / DGFT

As per the 99/2011-Customs notification dt. 9-11-2011, Arecanut is exempted from paying the whole of the duty of the customs when imported from the countries like Bangladesh, Bhutan, Maldives, Nepal and Afghanistan. The import data of Arecanut during the last ten years show a shift in source of import from Indonesia to Bangladesh, especially during the last three years. Arecanut import from Nepal also significantly increased in 2013-14 as shown in the table given below.

Export of Arecanut

Arecanut is a commodity, which has a very limited export potential. The bulk of the arecanut production is consumed within the country. However, a small quantity of arecanut is exported mainly meant for the Indian settlers abroad. Maximum export registered was during

Table 5. Import of Arecanut in India during the last ten years

Year	Indonesia		Bangladesh		Nepal		Total import	
	Quantity (tonnes)	Value (Rs in lakhs)	Quantity (tonnes)	Value (Rs in lakhs)	Quantity (tonnes)	Value (Rs in lakhs)	Quantity (tonnes)	Value (Rs in lakhs)
2003-04	16159	1894	6753	975	428	68	27957	3853
2004-05	25635	3270	2188	285	788	126	33091	4525
2005-06	39564	5013	8041	1216	636	125	53275	7228
2006-07	59020	7721	11339	2206	58	11	76678	11065
2007-08	7918	878	6882	1318	5	1	21299	3575
2008-09	28802	5999	5607	1537	2745	984	41797	9830
2009-10	23232	4160	6333	2092	4862	1575	39527	9441
2010-11	23293	5205	31673	11089	14604	7152	72697	24454
2011-12	5662	2172	55072	20102	8107	2922	71512	26354
2012-13	2281	1499	87403	52800	834	312	97316	58979
2013-14	2193	2040	37030	33257	18991	23066	66839	67532

2006-07. During 2006-07, India exported 5336 tonnes valued at Rs 2293 lakhs. During the year 2012-13, India exported 2273 tonnes valued at Rs 21.76 crores. Maldives was the major export destination of arecanut during the last two years. Export of Arecanut from India during the last ten years are given in table 6.

Price Behaviour

During the period from 2000-01 to 2004-05, the price of arecanut in the domestic market showed a declining trend due to increased production. . But during the period from 2004-05 to 2009-10, there was a marginal increase with the annual average price of dry arecanut ranging from Rs 4912 per quintal to Rs 6911 per quintal. From 2011-12 onwards, the arecanut prices showed an increasing trend and the same trend continued till now.

Table 6. Export of arecanut from India

Year	Quantity (tonnes)	Value (Rs in lakh)
2003-04	1809	1174.05
2004-05	3695	2066.12
2005-06	3458	2331.54
2006-07	5336	2293.04
2007-08	1472	819.90
2008-09	1518	1252.84
2009-10	1756	1025.00
2010-11	2486	1674.00
2011-12	1963	2083.85
2012-13	2273	2175.66
2013-14	2345	3847.86

Source: DGCI&S, Kolkata

Table 7. Monthly average price of Arecanut (dry) in Kozhikode market

(Price: Rs/quintal)

Month	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15
April	6380	5967	9780	13400	12050	17175
May	6220	5800	10500	12150	12440	17900
June	6025	5525	11300	11525	12900	19275
July	6240	5480	11540	12750	12025	27333
August	5950	5625	13325	12940	11900	
September	5800	6375	14420	14075	13500	
October	5675	7160	14375	13725	14225	
November	5575	7550	14975	13800	14150	
December	5850	8820	11560	13800	14325	
January	6520	8550	12200	14325	14800	
February	6475	7925	12775	14000	15125	
March	6040	7375	13880	13500	15875	
Mean	6063	6846	12553	13333	13610	20421

Cost of Production

Increasing cost of production is a major concern of arecanut sector. Cost oc cultivation varies from place to place. According to the study conducted by CPCRI, Vittal, the cost of production of one kilogram of areanut in a well-maintained garden was found to be Rs 126.49. The economic life span of the palm taken as 35 years and average annual production as 2700 kg/ha. Component wise costs are given below.

Table 7. Cost of cultivation of Arecanut (per ha)

Sl.	Item	Cost (Rs)
1.	Establishment cost	11,89,882
2.	Labour	1,15,000
3.	Annual maintenance cost (AMC)	2,23,215
4.	Interest on AMC	26,786
5.	Amortized value (initial establishment cost)	91,529
6.	Total cost of cultivation per ha.	3,41,530
7.	Average yield	2700 kg
8.	Cost of production (Rs/kg)	126.49

Source: CPCRI, Vittal

Diseases

Major problem in Arecanut cultivation is the prevalence of diseases like Yellow Leaf Disease (YLD) and Koleroga (Mahali or Fruit rot disease).

Yellow Leaf Disease of arecanut (betel nut) (*Areca catechu.* L.) is a serious disease mainly affecting arecanut palms in India. The disease was first reported from the central part of Kerala way back in 1949. Now, it's prevalent in parts of Kerala, Karnataka and Tamil Nadu states of India.

Etiology: Phytoplasma has been conclusively proved to be the causal organism due to its constant association in sieve tissue of the diseased palms, their absence in healthy palms, and its transmission from diseased seedlings to healthy seedlings using a plant hopper (*Proutista moesta*) as vector. It also spreads through dodder laurel (*Cassytha filiformis*) and shows remission of symptoms when treated with oxytetrcycline (OTC).

Transmission: The disease is reported to be transmitted by a plant hopper (*Proutista moesta*) and also spreads through dodder laurel (*Cassytha filiformis*).

Disease management: The disease is not amenable to chemical control measures. During the initial stage of infection, the infected plants respond to fertilization and soil amendments. However, in later stages of infection, the infected palms do not respond substantially to fertilization and soil amendments. Therefore the old gardens affected with the disease may be removed and alternate cropping may be thought of looking into the local conditions. In the areas where the disease spread is in the initial stages, it can be contained by eradicating diseased palms.

Koleroga (Mahali or fruit rot) and Bud rot: The Koleroga (fruit rot) and bud rot diseases of arecanut are caused by the fungus *Phytophthora palmivora* (Var. arecae) and infects mainly the nuts of arecanut. It also causes bud rot in the arecanut seedlings. In grown up palms it usually infects nuts and in severe condition it can also infect the growing bud resulting in death of the palm itself. Phytophthora is a soil borne fungus which survives in the soil for seasons. During the rainy season the spores of the fungus infects the nuts of arecanut, the fungus enters through

the perianth and spreads through the other parts. The nut rots and falls leading to the loss of yield. In severe condition the disease can cause 90-100% yield loss. The fungus thrives well in moderately hot and high relative humidity. The fungus spreads rapidly and the disease will be rampant when there is alternate rain fall and sunshine and cloudy weather. The fungus poses real threat to the arecanut cultivation in regions where continuous rains come in the way of controlling this pathogen.

Koleroga - Symptoms: Heavy shedding of nuts during rainy season - water soaked lesions are formed near the perianth end gradually covering the entire surface of the nut - the nut becomes dark green - finally lead to nut shedding.

Koleroga - Control Measures: Spray Bordeaux mixture 1% on all bunches three times in a year, one just before the onset of southwest monsoon and the rest at 40 days intervals. If monsoon season is prolonged give a third spray. Use rosin soda adhesive to ensure tenacity of the spray deposit on treated substrate. Remove and burn all fallen and infected nuts.

Bud rot - Symptoms : Yellowing of spindle leaf - rotting of growing bud and surrounding tissues - palm emits a disagreeable odour.

Bud rot - Control Measures: Remove the infected tissue completely and treat the wound with Bordeaux paste. Spray Bordeaux mixture (1%) to the crown of healthy palms which are in the vicinity of the affected palm.

Alternative Uses

Arecanut is popular as a masticatory used either with betel leaves or as plain or as scented *supari*. Arecanut has uses in ayurvedic and veterinary medicines because of its several alkaloids, but its utilization in this manner is negligible on the whole. Arecanut is rich in polyphenol (20%), fat (15%), starch (20%) and alkaloids (0.5%) and also rich in mineral matter which includes calcium (0.05%), phosphorus (0.13%) and iron (1.5 mg/100g). Besides it contains Vitamin B6 (286.9 mg) and Vitamin C (416.2 mg). It was found that tannins, a by-product from the processing of immature nuts find use in dyeing clothes, tanning leather, as a food colour, as mordant in producing variety of shades with metallic salts etc. The nuts contain fat, which can be extracted and used for confectionery purposes. The refined fat is harder than cocoa butter and can be used for blending.

The medicinal properties were described by Vagbhata (in 4th Century AD) as effective against leucoderma, leprosy, cough, fits, worms anemia, obesity. Recent studies have shown that arecanut has pharmacological uses viz. hypoglycemeic effect, mitotic activity, antihelminthic activity, cholinomimetic activity etc. Further, arecanut also shows medicinal value in the following lines however these properties are yet to be exploited for commercial use.

* In the metabolic system as a digestive and carminative
* Anti-diabetic (Research from Hyderabad Medical College)
* Used against certain skin diseases
* Used as aphrodisiac
* Improves eyesight when used as *Thamboola* seva
* Helps in relieving asthma
* CFTRI Mysore has developed a soft drink concentrate called *Pan Supari Nectar*
* For Low Blood Pressure (Old Arecanut)

(Source: Dr P. Rathinam Committee Report on Arecanut, 2001)

CPCRI has informed that they have conducted a wound healing study in collaboration with Kasturba Medical College, Manipal, which revealed that the alkaloid and polyphenols of arecanut could be used to enhance the healing of burn wounds, leg ulcers and skin graft surgery. Arecanut seed biochemical compounds have been recently recognized as functionally active molecules, possessing antioxidant, antidiabetic, antiallergic and other useful properties. Another study on antimicrobial and anticariogenic effect of arecanut extracts is in progress in collaboration with K.S.Hegde Medical College, Mangalore.

Though alternative uses and medicinal values of arecanut have been reported viable technologies are to be developed for exploiting it economically. Studies for the uses of arecanut in pharmaceutical, industrial and cosmetic sectors are to be intensified. Available alternative uses of arecanut for medicinal and industrial purposes have to be promoted through institutional funding in a wide manner to increase the domestic consumption of the produce.

Government intervention to address the problems of Arecanut farmers

To deal with the problems of Arecanut growers, the Government of India had constituted various Committees from time to time. The Expert Committee constituted by the Government of India in 2001 under the Chairmanship of Dr P. Rathinam examined the various issues related to arecanut and has recommend to stop further area expansion programme in Arecanut.

During 2006-07, the Government of India sanctioned an amount of Rs 1170.83 lakhs to Kerala State for the rehabilitation/ replanting programme of the YLD affected arecanut gardens in an area of 9541 ha, based on the proposal received from Government of Kerala.

In the year, 2007-08, the areca crop was severely affected by fruit- rot disease (Koleroga) in Karnataka. A Central team headed by the then Horticulture Commissioner Dr M.L. Choudhary visited the affected areas and recommended the remedial measures. To manage this disease, a special package wherein assistance at 50% of the cost up to a maximum of Rs. 1500 per hectare was provided to the beneficiary to take up two sprays of 1% Bordeaux mixture. The programme was taken up in Dakshina Kannada, Udupi, Hassan, Chickamagalur, Shimoga, Uttara Kannada and Kodagu districts. An amount of Rs 668.53 lakhs were utilized in these districts.

During 2009-10, Ministry of Agriculture, Govt of India constituted a Committee under the Chairmanship of Dr Gorakh Singh, the then Horticulture Commissioner, to study the problems of Arecanut growers of Western Ghats of Chickmagalore and Shimoga districts of Karnataka and to identify the measures for control of Yellow Leaf Disease (YLD) of arecanut. Based on their recommendations, necessary nutrients and plant protection inputs were provided through Integrated Nutrition Management (INM) and Integrated Pest Management (IPM) component of National Horticulture Mission (NHM) at 50% subsidy up to a maximum of Rs. 1,000/- per ha. An amount of Rs 51.89 lakhs and Rs 161.00 lakhss have been utilised for INM and IPM respectively in Shimoga and Chickmagalur Districts of Karnataka. Further, an amount of Rs 705.08 lakhs was provided to Karnataka State for rejuvenation, including rejuvenation of area affected by Yellow Leaf Disease (YLD) of arecanut as per the approved annual action plan of the State for 2011-12.

During the year 2013-14 again Koleroga disease affected a large tract of Arecanut in Karnataka and adjoining areas of Kerala for which assistance was provided by the Centre to mitigate the situation.

Present Strategy

Promotion of multi-species cropping in arecanut gardens is the present strategy being adopted by the Government to augment income from existing arecanut gardens. As per the study conducted at Central Plantation Crops Research Institute (CPCRI) Regional Station, Vittal, Karnataka, experimental evidences indicated that, in general, intercropping in arecanut was not harmful to the main crop. Banana, ginger, betel vine, tapioca, pineapple etc. are the suitable crops for intercropping in arecanut gardens. Black pepper, cocoa, betelvine, etc. are the crops suitable for mixed cropping in arecanut gardens. Research studies conducted by CPCRI revealed that the farming system with arecanut + black pepper + banana + cocoa is one of the best high density multi-species cropping system. Demonstration plots are being established by DASD to popularize the technology of multi-species cropping system involving Arecanut. DASD in association with CPCRI, Vital had established 6 frontline demonstration plots in six selected farmers' fields in South Kanara district to popularize this technology and thus to increase the net income per unit area. An amount of Rs 6 lakhs was utilized for the above purpose. In 2012-13, ten plots were established and are being maintained in 2013-14 and 2014-15 with a total financial assistance of Rs 20.83 lakhs.

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