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From the desk of Chairman

Dear Coconut farmers,

Climate change will have a native effect on coconut plantations due to increase in temperature and water stress. This in turn would affect the livelihood of millions of people who are dependent on this crop. Coconut tree, referred to as tree of life is an important part of the daily diet of millions of people. The eco friendly nature of this crop help to protect the environment. Annual national coconut production is 20440 million nuts of which more than 90% is locally consumed and the balance is exported as processed products like desiccated coconut, copra, oil, matured nuts etc.

Coconut performs well under mean annual temperature of 27°C to 29°C and rain fall of 1250-2500 mm/year. Increased temperature and scarcity of water as a result of climate change are the most critical factors that affect the yield of coconut. It is well recognized that the reproductive development in coconut is more sensitive to high temperature and water stress than vegetative development and the main harmful effect is poor nut set. Nut setting is the most important yield determining factor in coconut and reduced nut setting due to high temperature and long dry spells are experienced in coconut plantations due to climate change. Climate change due to high temperature and water scarcity also leads to the outbreak of more pests. Whitefly (*Aleurodicus spp.*) severely noticed in some locations of Kerala and Tamil Nadu is due to the high temperature and low humidity prevailing in these areas due to climate change. The degree of sensitivity to high temperature can vary with variety, depending on its tolerance to stress. Studies are being conducted to identify drought tolerant cultivars based on the crops reproductive survivability as a major adaptation to climate change. Drought management practices such as mulching, ploughing the soil, husk burial, mulching, establishment of cover crops, rain water harvesting etc. are also recommended to protect the palm from the adverse effects of climate change.

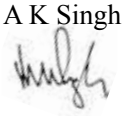
Coconut as a perennial tree crop with more than 60 years economic life span has great potential as carbon sink for mitigating climate change. The potential role of coconut plantation in mitigating global warming by acting as carbon sink is not adequately addressed by researchers. The carbon sequestration potential in coconut plantation varies with seasons, age of plantation, variety and management. It is also advisable to go for coconut based farming system with suitable intercrops, taping the advantages of high productivity, maximum biomass utilization, increases in soil microbial population and increases in soil water holding capacity which are helpful in plant growth and survival during low rain fall and drought conditions.

The role of coconut in cleaning the environment by carbon sequestration needs to be validated scientifically and disseminated to growers. It needs to be promoted in potential areas by taking into account its diversified uses as well as the clean development mechanism of this crop by acting as carbon sink.

Wishing all the readers a "Happy and Prosperous New Year".

With warm regards,

A K Singh



Chairman

Indian Coconut Sector: Trade and Marketing

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Introduction

Of late, coconut is faced with unprecedented crises on account of various macro and micro level factors. The productivity of the crop is constrained by the low input use efficiency in conjunction with other biotic and abiotic stresses which are priority areas of research. The aspects of mechanization also deserve adequate importance, considering the scarcity of skilled labour. Above all, the most important facet is value addition, which should be strengthened to mitigate the issue of low profitability of the sector. The post World Trade Agreement (WTA) and ASEAN Treaty regime witnessed integration of plantation economies across the globe that resulted in fierce competition among producing countries. The coconut palm exerts a profound influence on the rural economy of many states where it is grown extensively and provides sustenance to more than 12 million people in the country. The processing and related activities centred on the crop, generate employment opportunities for over three million people in India. Production and marketing of diversified high-value coconut products from all parts of coconut-the kernel, husk, shell, wood, water and leaves; are a potential source of income and employment for the rural people. In addition, the crop contributes Rs.90000 million annually to the Gross Domestic Product (GDP) of the country. The coconut sector contributes to foreign exchange earnings to the tune of Rs.21385 million, through the export of coconut and coir products. Over 90 percent of coconut farmers in India are small holders and are considered resource-poor. A substantial number of technologies have been developed for enhancing productivity and income from coconut farming. These include high yielding varieties and hybrids, water management and irrigation techniques, integrated nutrient management, coconut based cropping/farming system models, integrated pest/disease management practices and technologies for value addition through product diversification. However, due to various factors the level of adoption of these technologies is comparatively low. Hence, it is highly imperative that a favourable pro-poor policy environment is evolved to protect the interests of coconut growers in the country and appropriate development/ extension interventions are implemented to enhance the efficiency of coconut sector.

Trade scenario

During the year 2015-16 export of coconut products (excluding coir items) was valued at Rs. 1,45,024 lakhs as against Rs.1,31,238 lakhs during the corresponding period of the previous year (Table 1). This shows an increase in export by 11 percent in terms of value. Government of India has notified Coconut Development Board as an Export Promotion Council (EPC) for all coconut products other than those made from coconut husk and fibre vide Public Notice No.169 (RE-2008)/2004-2009, New Delhi dated the 1st April 2009. During the year 2015-16 import of coconut products (excluding coir items) in terms of value was Rs. 38,326 lakhs, that is around 11 percent less than that of the previous year's import (Rs. 42,166 lakhs in 2014-15). Coconut oil cake and coconut oil were the major two coconut products imported into India, of which coconut oil cake accounts for 86 percent and coconut oil accounts for 11 percent in terms of value of imports. During the period, the quantity of coconut oil imported amounted to 1001.88 MT as against 2663.03MT imported during the comparable period of the previous year. The striking benefit derived from the notification of CDB as EPC is reflected in the tremendous increase in the export share of coconut kernel products.

Table 1. Export of coconut products from India

Sl no	year	Export value (rupees lakhs)	Import value (rupees lakhs)
1	2007-08	6901	5593
2	2008-09	17980	10308
3	2009-10	21975	10716
4	2010-11	49592	12077
5	2011-12	94329	20988
6	2012-13	102236	19190
7	2013-14	115612	23111
8	2014-15	131238	42166
9	2015-16	145024	38326

Source: CDB, 2016

India, being deficient in edible oils, import of palm oil is a necessity. The price of coconut oil is closely linked with the prices of other edible oils. Among the vegetable oils imported during the previous year, palm oil and its fractions accounts for 73.10 percent and Palm Kernel oil (crude and refined) accounts for 1.40 percent. Being a lauric oil, imported palm oil seems to be the major competing oil for coconut oil and often beats down coconut oil prices in the domestic market. The excessive import of edible oils especially palm oil that too during the peak coconut production season would definitely trigger price crash of coconut oil. A closer look at the price movement of coconut oil reveals that import of large quantity of palm oil would result in crash of coconut oil price. Although in the very recent times, the coconut prices have become attractive, the confidence of coconut farmer can be elevated only when a stabilized price regime is experienced for a reasonable time frame.

Marketing issues

The studies on marketing margins and costs are important as they reveal many facets of marketing and the price structure as well as the efficiency of the system. The term 'price spread' refers to the difference between the price paid by the consumer and the price received by the producer. Price spread involves not only ascertainment of actual prices received at various stages of the marketing channel, but the cost involved in the process of the movement of the product. The impact of risks is more severe in the case of perennials, in which heavy initial investments are made. Price spread analysis of coconut marketing revealed that nearly about 70 percent of the farmers sell their produce through the village traders as raw coconuts.

Less marketable surplus due to small and marginal holding size is the major reason for the farmers for not undertaking copra/oil production for sale. The marketing channel consists of village traders, whole salers and retailers who in turn sell their products to oil millers and retailers and send some of their lots to upcountry markets as raw nuts, edible or ball copra. Predominant marketing channel identified is Producer-Copra maker-Oil miller-Whole saler-Consumer.

In Kerala conditions the producers share in consumer rupee is just around 64 percent and the market chain consumes as much as 36 percent share in the total value chain. Higher price spread always indicates a lower share of the final price to the producer. In other words it reflects the low marketing efficiency of the market channel. The price spread and marketing efficiency can be improved only through collective and constant efforts in terms of adoption of higher value addition technologies at individual or group level.

Plantation crops are vulnerable to the market related challenges especially in the context of trade liberalization and free trade agreements (Anoopkumar, 2011; Veeramani, 2011; Brigit, 2004). In the present scenario of frequent fall in market prices and unsteady markets and the absence of a very responsive mechanism/agency for prompt market interventions to ensure remunerative prices in the sector, it would indeed be a herculean task to motivate the farmers to continue with the cultivation and adopt resource-demanding modern technologies (Jayasekhar et al., 2014). Besides, attracting women and youth to agriculture, skilled man power, infrastructure and input support for secondary agriculture are the major challenges. Further, preserving and sustaining the economic viability of all the members of the commodity chains of mandate crops is a major challenge which requires research support for small scale, diverse and sustainable enterprises.

The problems of low income from coconut holdings due to decline in the prices of coconut and its products necessitated the need for development of appropriate coconut based farming systems to enhance the farm level income and development of broad based processing technologies for the sustainable growth of the industry (Mani and Santhakumar, 2011). Consequent to the liberalization of the Indian economy, the domestic industry has not been catching up commensurate with the growth of other world leaders in coconut sector. However, new vistas could be opened up in value addition and product development through infusion of technologies and emergence of a variety of products in the edible and non-edible sector. Now, the coconut industry in the country has realised the imperative need to become competitive. Consumer demands for varied high value products have also started recording an increasing trend.

Coconut prices in India have been historically integrated with the coconut oil prices. Therefore, indubitably the coconut prices received by the farmers are integrated with the MSP of copra. In general the farmer prefers to sell fresh coconut when the price of coconut is attractive, as he receives a remunerative sum in his hand immediately and he can get rid of processing and transportation charges. Contrary to this, if the copra and oil prices are lucrative; farmer prefers to do at least primary level processing which would augment farm level copra production. Therefore, the MSP for copra fixed at higher levels would certainly influence and act as an incentive for primary value addition in coconut.

Having said this, the procurement system of copra in India was always ineffective, and it never elevated the market prices to a higher level. From the NAFED's point of view, the agency, though could procure large quantum of copra and has the capacity to convert copra into coconut, never find the market to push their product

with at least a minimum margin. It should be in such a way that the MSP ensures an incentive for processing to the coconut farmers when compared with that of selling fresh coconut. Other pertinent factors in this context of discussion are lack of effectiveness and efficiency in copra procurement by the agencies and inadequate infrastructural facilities for the storage of copra. It is noteworthy that for the most part of the year copra is traded below MSP.

Strategies for Streamlining

In the evolving trade liberalization regime, sustaining coconut cultivation as a profitable enterprise is extremely challenging. Hence the policies should focus more on competitiveness through higher productivity. One way to achieve this goal is through reduction in cost of production or in other words increase in net returns. There are possibilities of increasing the productivity and net return from coconut gardens by raising compatible subsidiary crops and/or integrating with live stocks. The farming system models of CPCRI have conclusively proved that the scientifically designed coconut-based farming system is not only capable of generating higher income, but also generates additional employment for small-holders (Sahasranaman et al., 1983 ; Hegde et al., 1990 ; Das, 1991; Thamban and Arulraj, 2007). In a scientifically laid out coconut based farming system unlike the traditional ones, the resource use efficiency gets considerably enhanced from crop interactions in the system. Moreover, farming systems are capable of improving the financial status of the smallholder, while permitting him to use the available resources more efficiently.

In this context, it is worthwhile to mention the results of cluster level field interventions conducted by CPCRI at Kasaragod district under the NAIP project. The average yield of coconut in the selected gardens prior to the implementation of the project was 62 nuts/palm (in the year 2007-08). After three years of implementation of the project the coconut yield was increased to 112 nuts/palm, which is 80% more than yield reported from the base line survey. A number of compatible intercrops were grown in the farmers' garden as part of the project, that include banana (four varieties), root crops (elephant foot yam, dioscorea, tapioca), vegetables, fodder grass and turmeric. Besides, pepper, nutmeg and cocoa were also planted in the interspaces of coconut. It was observed that the yield of coconut is better in gardens with banana and root crops (EFY in particular) as intercrops.

Based on the economic performance of different intercrop combinations, five most profitable combinations are presented in Table 2. Coconut garden intercropped with banana, recorded the highest net returns among the different crop combinations. However, this system is suitable only where assured irrigation facilities are available. A farmer with limited irrigation facilities may choose coconut+ EFY combination.

Table 2: Crop combinations and net returns

Sl No.	Models	Net Returns(Rs/Ha.)
1	Coconut+Banana	288621
2	Coconut+Banana (50%)+EFY/ Veg(25%)+Turmeric(25%)	259701
3	Coconut+EFY/Veg(50%)+Turmeric(50%)	230782
4	Coconut+Turmeric	199705
5	Coconut+EFY(Rainfed condition)	163101

It is categorically proved that, scientific coconut based farming systems will mitigate the price risks of coconut monocropping by providing adequate additional returns. The recent field results from ICAR-CPCRI shows that coconut based cropping system, using multi species cropping of coconut with pepper, banana, nutmeg, pineapple, ginger, turmeric and elephant foot yam generated a net income of Rs 3, 62,595 per ha, which is 150% higher than that of coconut monocrop (Rs 1,41,505), where as coconut based mixed farming system (CMFS) with coconut, pepper, banana, crossbred cows, poultry birds, goat and pisciculture generated a net return of Rs. 5,50,214 which is 288% higher than that of coconut monocrop.

It is of paramount importance to develop an exclusive policy by each coconut growing state for production and supply of elite planting materials to the farmer. Each state should have a separate policy frame for the area expansion and rejuvenation programmes and for the generation of required planting material of suitable varieties. There should also be separate development schemes for the execution of the programmes according to the policy frame.

Community Based Organization of coconut farmers at different locations may be identified for establishing certified coconut nurseries for the production of elite planting materials. The ongoing decentralized planning programme in states like Kerala can support such initiatives for farmer participatory schemes for production and distribution of elite planting materials. The decentralized seedling production programme can be strengthened by maintaining a centralized pollen storage and supply mechanism to ensure the quality of the pollen parent. Accreditation should be made mandatory for all coconut nurseries as a regulatory mechanism and ensuring control in the production and distribution of planting material.

CPCRI being the pioneering national research institute involved in developing improved varieties of coconut can provide breeder seed/source material for establishing nucleus seed gardens. Besides, CPCRI can also play a vital role in the capacity development programmes on nursery management to be organized for the benefit of technical personnel of CDB and state Agri/Horticulture Departments. Collaborative programmes involving stakeholders representing private sector nurseries are also important in formulating viable strategies for ensuring production of sufficient quantities of elite planting materials. CPCRI has already supported such initiatives by imparting training on hybridization technique to the technical personal of private nursery groups.

There exists a huge scope for coconut based agribusiness in India with reference to processing and value added products. The crop provides employment opportunities to more than 10 million people in the country. Agribusiness management on a mission mode approach aims for maximization of farmers' income, employment and sustainability (Sairam et al., 2008). Technologies are available for individual processing for the production of snowball tender nut, coconut chips, copra, vinegar, desiccated coconut (DC), coconut shell charcoal, packed tender coconut water, coconut cream and milk powder. The economics of production of coconut based value added products indicates fairly high level of capital requirement towards establishment and operation of these enterprises. The attractive returns from the business will, act as the motivating factor and moreover, coconut farmers are expected to realize better price stability in long run.

Due to the growing consumer demand for Desiccated Coconut across the world, there exists immense export potential for the product. The capital investment required to start up a Desiccated Coconut production unit with capacity to process 15,000 coconuts per day, amounts to Rs 1.29 Crores. It is noteworthy that there are attractive export promotional schemes initiated by the Government of India under the new Foreign Trade Policy (2015-20), wherein under Merchandise Export from India Scheme, five percent export subsidy can be availed on Free on Board (FoB) prices. There is also a Duty Draw Back scheme wherein up to one percent of the FoB prices are refunded for the service taxes paid for raw materials and other input services for the production of Desiccated Coconut.

Virgin coconut oil (VCO) has received much attention globally in the recent times. The popularity of VCO is growing among consumers in all the continents due to its myriad properties including potential health benefits. Feasibility analysis of the project on commercial production of virgin coconut oil revealed a Benefit Cost Ratio of 1.12, and an Internal Rate of Return of 21.5 %. Thus, we may conclude that the commercial production of Virgin Coconut Oil could turn out to be a profitable venture. Though the market of VCO is expanding in the domestic and international front, as a matter of fact, India is yet to realize the potential benefit that the country holds in this segment. It is imperative to establish good quality, technically advanced VCO units across the country so as to realize the competitive market share of VCO in the global market.

As a matter of fact, processing and value addition in coconut sector has to be scaled up manifold. India is lagging far behind in processing for value addition and export even in comparison with countries like Sri Lanka. The coconut industry can be revived if it is made part of Prime Minister's 'Make in India' campaign. This can be made possible through formation of coconut parks across the major hubs, which can provide new impetus to the coconut industry by ensuring economic enhancement of the farmers and other stakeholders through large scale activities.

Summing Up

In the future, it is envisaged that globally well connected and highly interlinked commodity chains will evolve, requiring a reorientation of the scope of the research and developmental Institutes to accommodate the restructured commodity chains and changing concept of commodity markets. The Institutes should take a lead role to re-engineer and revitalize the coconut sector in the country by providing adequate emphasis on product diversification and creation of neo-market platform to promote coconut as an organic health drink with Good Management Practices (GMP), Good Agricultural Practices (GAP) and Hazard Analysis and Critical Control Points (HACCP). Institutes should facilitate co-creative, innovative, vibrant social enterprises which will enable to pass on the value creation in coconut sector to farmers in an appropriate manner which reduces the social disparity. With the growing realization of lesser profitability in small farm holdings, producers/farmers should be encouraged to get together and form into small cooperatives or crop based organizations to develop and utilize community facilities for farm operations, post harvest processing and marketing to economize on production as well as marketing costs. Further, research orientation will lead to an increase in the number of economically viable coconut farms of different sizes and increase in the number of processing enterprises. For the vision of developing a sturdy and vibrant coconut industry which does not depend on copra or coconut oil to come true, we need to come up with a breakthrough coconut product which is strong enough to capture the niche export market segment.

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Gradient out break and bio-suppression of spiralling whitefly in coconut gardens in South India

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Spiralling whitefly, *Aleurodicus spp* is a polyphagous exotic hemipteran insect pest invading more than 500 plant species including coconut and native to New World tropics occurring in Central and South America and the Caribbean. During 1995, *Aleurodicus dispersus* was first reported as an invasive pest of cassava in Kerala, India and later from other parts of the country. This pest is presumed to have entered India from either Sri Lanka or Maldives (Mani, 2010). It caused severe damage to guava, papaya and many other crops and moderately infested coconut seedlings. In addition, moderate infestation of *A. dispersus* was reported from Minicoy, Lakshadweep Islands during 2010, but it was suppressed naturally through predators and parasitoids prevalent in the region. The natural enemy complex included two species of lady beetles viz., Chilocorus subindicus and Scymnomorphus sp., one hump-backed nitidulid predator, Cybocephalus sp., and parasitoids belonging to Encarsia spp. (Josephrajkumar et al., 2010). Despite its sporadic outbreak noticed in different ornamental plants and fruit tress especially guava and papaya during the initial period of occurrence, *A. dispersus* was biologically suppressed by natural build of entomophaga in all ecosystem.

During the initial outbreak occurred in late 90's, coconut was not reported as the preferred host for *A. dispersus*. Very recently during August-November 2016, sporadic outbreaks of spiraling whitefly Aleurodicus sp. were reported in coconut from different regions of Pollachi (Tamil Nadu), Palakkad (Kerala), Kottayam (Kerala) as well as Pathanamthitta (Kerala). However, in the present scenario, coconut was found as the most preferred host for this whitefly pest especially in the context of deficit monsoon and therefore involvement of a different species is suggested. In the current survey, outbreak was confined to certain areas adjacent to water bodies especially in those regions of Chethankari (Pathanamthitta) and Kumarakom (Kottayam).

The shift in weather pattern reflected as deficit monsoon could be one of the primary reasons of immediate upsurge of spiraling whitefly. They are so sensitive to wet season and heavy rains and the recent deficit in monsoon (>35% in Kerala), which triggered a drop in relative humidity (up to 7% compared to the previous year), is the immediate reason for the flare up. Increase in temperature over 2ºC during summer is another pre-disposing factor for the increase in pest population. Emergence of sucking pest as a victim of climate change thus, warrants close scrutiny. Besides, there are several potential invasive *Aleurodicus spp., viz., A. pulvinatus, A. dugesii, A. pseudugesii, A. ruigopercualtus, A. cocois*, etc. reported from other

Eggs

Mobile crawler

Immature stages

Colony of whitefly

Female whitefly with brown patches

Male whitefly with claspers

countries causing severe damage. As coconut is a the homestead crop in Kerala with intercrops such as banana, vegetables, curry leaf, tapioca, etc. grown along with it, the sooty mould developed on coconut and other crops is of concern to the farmers.

The pest

Spiralling whitefly is a small sap sucking insect belonging to Hemiptera Order which is taxonomically related to mealy bugs and aphids. The adult whitefly looks like a very small moth and has a body length of about 2 mm. Wings of adults are white and have dark spots on the forewings. Adults have greyish eyes. The males are slightly smaller than females and have elongate claspers at the distal end of the abdomen. Eggs are elliptical and yellowish in colour, 0.3mm long, translucent with a short stalk and are laid singly and associated with irregularly spiralling deposits of white flocculent wax surrounding each egg in a semi-circular spiralling fashion. The spiralling of waxy material is the feature from which its common name, spiralling whitefly is derived. Adult whiteflies had opening on the ventral side through which the white flocculent material emerges out. The first-instar crawlers are the immature stage with functional legs and distinct antennae and are mobile. Subsequent larval stages are sedentary and have oval shaped soft bodies with cream colour studded with white waxy material on the sides. The final immature stage is the pseudo-puparium, which is about 1 mm in length and is used in taxonomic identification.

Nature of damage

The immature and adult whitefly by their sucking feeding habit, siphon out coconut sap by selective feeding on the under surfaces of the leaflets. Extensive feeding of the insect leads to the excretion of honey dew which subsequently gets deposited on the upper surface of the leaves positioned down beneath or even on other under storey crops. Honey dew excrement, being sweet and watery, attracts ants and encourages growth of the fungus *Capnodium sp.* which causes disfigurement of hosts affecting the photosynthetic efficiency of the plant. Since the outer whorl of fronds of coconut palm, which already bear coconut bunches of different maturity, do not contribute to the nut yield considerably, the whitefly infestation with minimum tissue damage and sooty mould on the outer whorl of fronds may not result in yield loss. Since the black tinge on crop plants (sooty mould) are mere sugar feeding fungus, farmers need not be worried about such tinge on crops plants as they are not poisonous. Waxy flocculent material produced by the adult whiteflies, however, can be another nuisance to human beings, as they get dispensed with a fluff of white dust, the moment insects are disturbed. Despite heavy incidence of whitefly on coconut, it is not practically causing any economic crop loss and therefore, there is absolutely no need for any panic. In the recent survey conducted in heavily affected gardens, cutting across all age groups of palms, as high as 60-70% of the fronds were found infested by the pest. The prevalence of the pest was noticed from the outer whorls and slowly progressed towards the inner whorls, whereas, the emerging fronds were not infested.

Spiralling egg laying mode

Extensive damage on the lower leaflet

Coalescing of spirals

Aggregated adult whiteflies

Sooty mould symptom on upper leaflets

Host plants

In the recent survey, at least ten alternate host plants were observed (*Psidium guajava; Musa sp., Myristica fragrans; Colacasia sp., Garcinia sp., Annona muricata; Murraya koenigii; Spondias mombin; Mangifera indica and Artocarpus heterophyllus*) in coconut homesteads, but the pest is relatively more confined to coconut and the reason for its selective preference more aligned towards coconut is a researchable issue warranting species level identification of the pest.

Natural enemies

In the present investigation, it is observed that more than 50% of the whitefly was parasitized by a tiny hymenopteran parasitoid, *Encarsia sp.* (<1 mm size) from different tracts of Kerala indicating the natural build of the parasitoids. This is one of the classical biological control strategies and any disturbance in the build up of *Encarsia sp.* would invariably affect the long term approach in pest bio-suppression. In addition, lady beetles belonging to Jauravia sp. and a wide array of spiders were also noticed. With the emergence of Aleurodicus sp. in coconut and natural build up of *Encarsia sp.* in Kerala, it could be well understood that the pest-defender system should be carefully conserved in the region so as to encourage population build up of the natural enemies. Fortuitous introduction of Encarsia sp. along with the pest or wide-range parasitic ability of the indigenous *Encarsia sp.* will be ascertained once the species is identified. However, the co-evolutionary occurrence of the parasitoid *Encarsia sp.* with the dynamic emergence of a new *Aleurodicus sp.* suggest for the gradient outbreak of the pest, in tune with the weather change phenomena experienced in 2016 in South India. Under such situations, no insecticides should be applied to manage the pest. Introduction of parasitized pupae is a good strategy in the emerging pest inflicted zones for effective bio-suppression of whitefly.

Whitefly colony on curry leaf

Whitefly colony on Banana leaf

Strategies for whitefly management

Use of insecticides is not a viable option for the management of whitefly as it only reduces the build of natural enemies, especially those belonging to Encarsia spp. Therefore, population build up of natural enemies either through conservation or introduction of parasitized pupae would be a feasible and sustainable alternative approach at this point of time for the long-term bio-suppression of *Aleurodicus sp.*

Predatory grub of lady beetle

Jauravia sp

Spider

Parasitised pupa

Exit hole of Encarsia sp.

Encarsia sp. (<1 mm size)

The integrated pest management strategies to be adopted include:

1) The pest population is likely to recede with monsoon showers and build up of natural enemies and hence, no insecticides should be applied.

2) Application of 1% starch on the sooty mould affected leaves to flake out the mould.

3) Fix yellow sticky trap of one metre width painted with white grease or castor oil on the trunk of infested palms.

4) Conservation and re-introduction of parasitized pupae, *Encarsia sp.* in new emerging zone for long-term pest suppression.

5) In severally infested gardens, spray neem oil @ 0.5% targeting the lower whorls of fronds.

Awareness campaign about the pest should be made through immediate capacity building programmes for sensitizing the farming community about the sustainable bio-suppression of the pest through natural enemies.

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Outbreak of coconut slug caterpillar in Karnataka

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The slug caterpillar is a sporadic out break insect pest on coconut which cause up to 50% yield loss during severe infestation. Recently a severe outbreak of the pest has been reported from Ramenahalli and Bommenahalli villages of Kibbanahalli panchayath, Tirptur taluk, Tumkur district of Karanataka state. Two farmers (Shanmukappa from Ramenahalli and Shankaralingaih from Bommenahalli) suffered heavy loss (23.143% infested palms and 85% leaf damage) due to the outbreak of slug caterpillar. In their 23 year old coconut garden, out of 612 palms, 154 palms were infested which resulted in a gradual reduction in yield.

First coconut slug caterpillar outbreak in Karnataka was reported at Devanahalli taluk, Bangalore district in 1995. In Andhra Pradesh, incidence of this pest was observed during 2007, 2012, 2013, 2015 and 2016 in coconut gardens of East Godavari and West Godavari districts.

The pest

For effective monitoring and timely management of the pest, correct identification of the pest is required. *Darna nararia Moore* commonly known as coconut slug caterpillar belongs to the Family *Limacodidae of Order Lepidoptera*. Its eggs are very tiny, scale like, translucent initially and difficult to locate. Larvae are dark brown dorsally with V- shaped bright greenish yellow markings on both side and tubercles along lateral margins. Tiny bunches of minute urticating hairs are present on the sides and dorsal area. Larvae may grow up to a length of 1-1.8 cm. The larval period lasts for 22-46 days. They pupate inside a round brownish shell (5-9 mm length) like cocoon attached to the leaves. The shell is covered sparsely by light yellowish brown silk. Pupation lasts for about 9-13 days. Adult moths are small brownish with faint black lines on wings. Females are larger with a filiform type of antennae whereas males are smaller with a bipectinate type of antennae. Female lays about 180-200 eggs in groups on the surface of leaves.

Different stages of D. nararia.


Larva


Pupa


Adult moth

Characteristic damage symptoms

The larva is the destructive stage of the pest. The young larvae feed on the lower epidermis of the leaf. Pest feeding on leaf lamina results in development of necrotic spots in early stage. Later instars feed on whole leaf blade leaving only the midribs. In heavy infestation, the larvae may defoliate the palm. Affected leaf fronds show burnt appearance and in case of severe attack the whole tree looks dry. They can also survive on maize, jowar, arecanut, napier grass, bajra and some weeds.

Measures taken to manage the pest in Ramenahalli and Bommenahalli villages

• Management of slug caterpillar in Ramenahally was carried out under the supervision of experts from All India Co-ordinated Research Project (AICRP) on Palms centre Arsikere. A team of scientists visited the slug caterpillar infested areas and took initial observations. Later, AICRP centre Arsikere conducted roving survey in the entire district of Tumkur to identify the extent of damage. They created awareness among the farmers regarding slug caterpillar and its management.

• A team of Scientists from ICAR-Central Plantation Crops Research Institute

Dr. A. K. Singh, Chairman, Coconut Development Board chairing the session on Advancement in technologies and studies for proactive responses to future threat during the 47th Cocotech meeting held at Bali, Indonesia during 26-30 September 2016

Visit of scientists to slug caterpillar infested garden at Ramenahalli

Infested frond

(CPCRI), Regional station- Kayamkulam visited the slug caterpillar infested field at Bommenahally and suggested to install 4-5 light traps/ha and spraying of Bt formulations 1g/l to suppress the pest population.

• A field trial was conducted at Ramenahalli for the management of slug caterpillar by installing light traps (mercury vapor bulb) and spraying of Bt formulations which resulted in drastic reduction of pest population from 23% to 2%.

• Studies on biology of D. nararia and different bioassay studies were carried out at Entomology laboratory, HRIS, Arsikere center.

• Importance should be given to conservation of natural enemies in the field, so that the pest population can be maintained below economic threshold level. ■

Moth trapping using light trap

Moths trapped by mercury vapor bulb of 260 watt

Basal stem rot disease

A bane to coconut grower

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Coconut is an important plantation crop cultivated in the country. Looking into its multifaceted usages, the crop is named Kalpavriksha. In the recent past, there have been drastic changes with respect to coconut production, especially in the southern parts of the country. Coupled with persistent drought, the insect and disease attacks are also hindering coconut production. Of the major diseases, basal stem rot incited by *Ganoderma spp*. is a serious disease affecting coconut. The disease has been called with variety of names viz., Ganoderma wilt, Basal Stem Rot, Anabe Roga and Thanjavur wilt. This disease was reported way back in 1906 by Buttler in India. Later, during 1952 the disease appeared in Thanjavur district of Tamil Nadu and hence, named Thanjavur wilt.

The disease is prevalent in most of the growing areas of Southern India. This disease is considered as lethal disease, as it completely kills the palm in advanced stages. Surveys conducted in major growing areas of Karnataka indicated that on an average 10-15 per cent of palms are infected with BSR. The worst case of the disease is that, it remains asymptomatic till bleeding patches occur on stem. In general this disease is observed in all growing packets of Karnatka. However, Hassan, Tumkur and Chickmagalur districts have reported to have severe incidence of this disease.

Symptoms of the disease

The variety of symptoms exhibited in infected palms can be seen on the various parts of plant.

Root: The soil resident fungus enters through the young roots and the roots get infected. The infected root starts rotting and the same proceed towards the bole. Until then, there won't be any external symptoms visible in palms. As the infection progresses, root discoloration and extensive rotting of root systems are seen. Further, there will be progressive reduction in regeneration of new roots.

Stem: The exudation of reddish brown viscous fluid from the basal portion is the characteristic symptom of the disease. By the time when exudations are observed on stem, rotting of bole would have progressed from bole to basal portion of stem. The bleeding patches gradually increase up to 3-3.5 meter height as the disease advances. The internal tissues of the infected palm stem turns brown in colour and this discoloration will be usually confined up to the height to which external bleeding symptoms are visible. In advanced stages, basal portion of stem decays completely. Occasionally, some infected palm doesn't show any bleeding symptoms. The sporophores of the fungus, Ganoderma appear at the base of the affected trunks in some palms prior to wilting or just after the death of the palm.

Crown: The leaflets of outer most whorls start showing signs of yellowing and wilting. The drooping and drying of leaves is the most prominent symptom of the

disease. As the disease advances, the remaining leaves also droop down in quick succession. Under prolonged infection, the outer leaves fall off one by one leaving spindle with only few unhealthy leaves around. The spindle leaves which emerge subsequently are of reduced size and don't unfold properly. In some cases, leaves break off near the base of petiole. In certain cases, soft rot sets in at the base of the petiole. The affected tissues emit a bad smell and in advanced stages, the crown is blown off leaving a decapitated stem.

Etiology of the disease

The disease is incited by fungus named Ganoderma lucidumand G. applanatum. The aerial mycelium is hyaline, thin walled, branched with frequent clamp connections, 1.4-2.9 µ in diameter; chlamydospores formed abundantly which are slightly thick walled, terminal or intercalary and ellipsoid. The fungus grows very well in Walkman's medium.

Management of BSR

Restriction on movement of seedlings from infected gardens

The coconut seedlings used for planting should be obtained from healthy garden. Further, transport of seedlings from infected garden to other should be invariably avoided as the pathogen spreads through soil.

Phytosanitation

The dead palms remaining in gardens and also stumps present in diseased garden needs to be removed along with complete roots and burned. In most cases, the infected stumps harbor the Ganoderma brackets which are proven source of secondary inoculum. Hence, strict phytosanitary measures will reduce the inoculum load in the diseased gardens.

Agronomic practices

Special care should be taken not to make any injuries to the plant parts during intercultivation operations.The diseased palms should be separated from healthy palms by digging trenches of 30 cm wide and 60 cm deep. Adopt summer irrigation or moisture conservation by coconut husk burial in the basin. Avoid flood irrigation and deep ploughing in infected gardens in order to prevent inoculum spread. Adopt drip irrigation method. Cultivation of banana as an intercrop will reduce the disease incidence in coconut gardens.

Nutrient supply

1. Application of 5 kg neem cake, 25 kg vermi-compost and 25 kg Farm Yard Manure per palm per year is essential. The recommended fertilizers viz. 500 g nitrogen, 320 g phosphorus and1200 g potash per palm per year need to be given.

Biological agents

Growing of green leaf manuring crops in the infected gardens is helpful in reducing inoculum. Application of Trichoderma 100-125 g and 200 g phospobacteria along

with FYM or neemcake or vermicompost per palm will reduce inoculum present in soil.

Chemical methods

Root feeding of Hexaconazole 5% EC @ 2 per cent (2 ml in 100 ml water) at once in three months is most effective in reducing the incidence. The young root with carrot colour of pencil size should be selected. Forty litre of 1% Bordeaux mixture or 0.2% Hexaconazole 5% EC (80 ml Hexaconazole in 40litre water) should be drenched around infected palms.

Research and Extension activities pertaining to Basal Stem Rot Disease at Horticultural Research and Extension Centre, Arsikere

The Horticulture Research and Extension Centre, Arsikere is under the umbrella of University of Horticultural Sciences, Bagalkot. The center is also operating Indian Council of Agriculture Research (ICAR) sponsored All India Coordinated Research Project on Palms (AICRP). Under this project, exclusive research and extension on the BSR disease is being undertaken. As part of research, root feeding of Hexaconazole 5% EC was identified as best chemical in curtaining the spread of disease in coconut gardens. Further, new molecules of fungicides are also being screened against disease. As an integrated approach, the combination of Pseudomonas, Trichoderma and chemicals are also being evaluated under field conditions. The experiments on evaluation of integrated approaches for the management of this disease is being taken at Gandsiin Chennarayapatnataluka of Hassan District. In addition to this, screening of genotypes of coconut against Ganoderma disease is also under progress at this centre.

An exclusive extension center for transfer of technology to the farmers is established at this center. As part of extension, various trainings, demonstrations and awareness programmes are being carried out. The integrated management practices for BSR are also being demonstrated in field at Bommasamudra village in Arsikere Taluka. ■

Coconut Sector : Global Scenario and Indian Perspective

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Introduction

There are umpteen reasons for the right kind of preparedness in the international spectrum of coconut and value added products of coconut. Some of the pertinent aspects are: the declining share of coconut oil in the world's oils and fats market, a proposed levy on vegetable oil imports to the European Community and a campaign against coconut oil in the US, more stringent aflatoxin regulations imposed in the international copra market and erosion of the European desiccated coconut market. The EU has a set of regulations that can impact on most aspects of coconut industry. They relate to health, food safety and other regulations such as those related to packaging, waste recycling and labour laws. In this regard, entrepreneurs who wish to enter this market should give cognizance to the regulations governing market entry. It is pertinent to note that the failure to respond to changing patterns in the world trade in coconut products could have adverse effects on employment and revenue of the APCC countries that are mainly depending on coconut as a major livelihood option. Therefore, it is important to define the factors that drive international coconut product markets; assess the factors that determine demand in the major consumer nations of the world and identify threats to the industry's viability posed by US and European Community trade restrictions, competition from other oils, and mycotoxin contamination & other food safety issues. This is imperative, especially for the APCC countries as the coconut palm exerts a profound influence on the rural economy of these countries where it is grown extensively and provides livelihood security for about 64 million farm families, of which 12 million are Indians. The contribution of coconut to GDP of the country is around Rs. 9000 crore. The processing and related activities centred on the crop generate enormous employment opportunities for the multitude.

Global production scenario

Although coconut is widely dispersed in most of the tropical regions and grown in 93 countries in the world, out of 12.2 million hectares of global area under this crop, close to ten million hectares is contributed by only four countries, namely Indonesia, Philippines, India and Sri Lanka (Table 1). These countries contribute 80 per cent of the total area under coconut and its production in the world (Figure 1). The export market of coconut and coconut products is highly concentrated with less than half a dozen exporting countries accounting for over 80 per cent of the total quantity traded in most cases. India stands 3rd in world area of coconut and first in production with the share of 17 per cent and 31 per cent respectively (Figure 2). Indonesia holds largest area in coconut (29 per cent) followed by Philippines. As far as the productivity is concerned Brazil holds the highest position (11630 nuts/ha) followed by India (10119 nuts/ha)

Table 1. Global Coconut Production

Countries	Area ('000 Hectares)	Production (million nuts)	Productivity (nuts/ha)
Indonesia	3610	16354	4530
Philippines	3502	14696	4196
India	2141	21665	10119
Srilanka	440	2870	6523
Brazil	251	2919	11630
Papua New Guinea	221	1483	6710
Thailand	206	1001	4859
Mexico	169	1119	6620
Vietnam	159	1246	7834
Vanuatu	92	415	4512
Malaysia	88	653	7420
Others	1317	5416	3754
World	12196	69836	5777

Source: APCC Statistical Year Book 2014

World export of coconut oil and VCO

As a matter of fact, in the last decade, production of edible oils in the world increased to 72 per cent and palm oil alone contributed to the tune of 5 per cent due to tremendous increase of oil palm production to an extent of 152 per cent. The increased availability of oil palm, soybean and rapeseed oils reduced the share of coconut oil in total edible oil production. USA is the single largest importer of coconut oil (32%) and the EU's import share is 33%

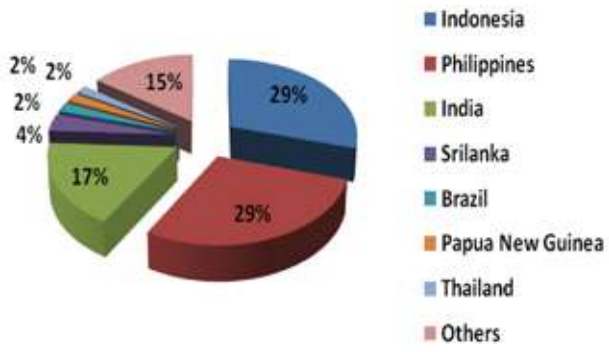


Fig 1. Percentage share in world coconut area

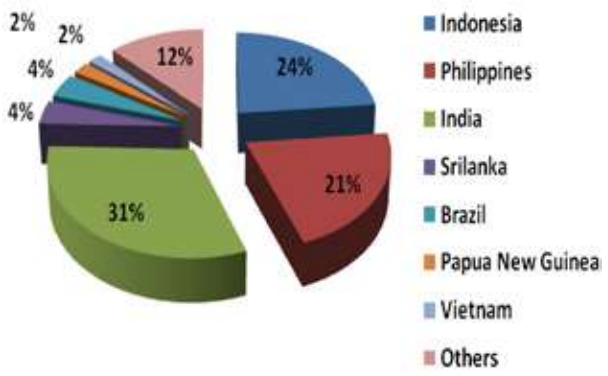


Fig 2. Percentage share in world coconut production

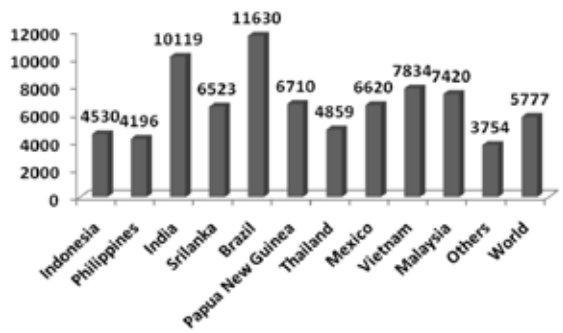


Fig 3. Global coconut Productivity (nuts/ha)

Philippines and Indonesia are the leading coconut oil exporters, wherein they together contribute 77 per cent of the total world export (Table 2, Figure 4). The share of India is quite in significant (0.3 per cent). In this context, we need to develop adequate startegies to catch the potential and developed markets of coconut oil across the world.

Virgin coconut oil (VCO) has received much attention globally in the recent times. The popularity of VCO is growing among consumers in all the continents due to its myriad properties including potential health benefits. The fast developing and high value niche global market for virgin coconut oil offers a good prospect for the improvement of the income of coconut farmers and others. USA is the largest importer of VCO in the world. The European market for VCO has also grown significantly over the past years, driven by the increasing attention that European consumers are paying to healthier diets. Globally, the Philippines is the largest exporter of VCO. Besides Philippines, other leading VCO exporters are Indonesia, India, Malaysia and Papua New Guinea. India exported 818 MT VCO in the year 2015-16 and this is 3.8% higher than the quantity exported during the previous year. US is India's major export destination.

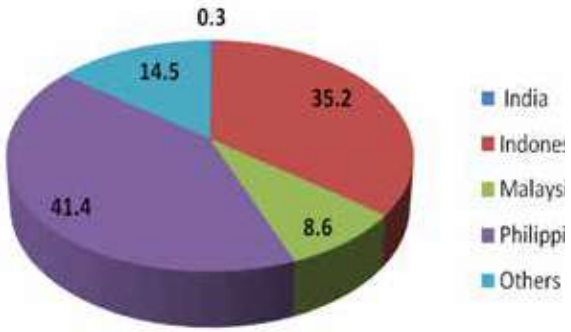


Fig 4. Percentage share of coconut oil exports in the world

Table 2. Quantity of coconut oil exports in the world (in tones)	
Country	Quantity
India	7067
Indonesia	771419
Malaysia	187665
Philippines	907606
Others	317154
World	2190911

World export of copra meal

Copra meal is an important commercial by product of copra, which has got significant use in the large scale

production of commercial cattle feed. We may observe that the world export market of copra meal almost falls into the category of oligopoly, wherein Indonesia and Philippines together contribute 96 per cent of the total exports (Table 3, Figure 5). India never developed an efficient export chain of copra meal, chiefly due to the huge absorption of this by product into the domestic market as cattle feed.

Table 3. Quantity of copra meal exports in the world (in tonnes)	
Country	Quantity
India	37
Indonesia	281336
Philippines	551198
Others	16203
World	866441

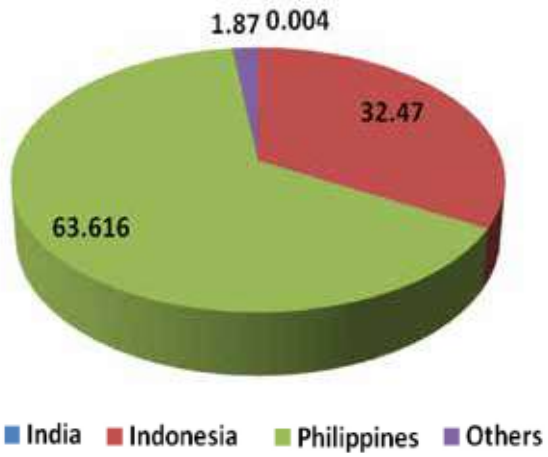


Fig 5. Percentage share of exports of copra meal in the world

World export of Desiccated Coconut

Desiccated coconut is prepared from substantially sound white kernel obtained from the whole nut of coconut. Desiccated Coconut is rich in healthy saturated fats with no cholesterol and is an excellent source of dietary fibre. With 30% of the world's imports, the European Union (EU) remains as the largest importer of desiccated coconut in the world. The Philippines and Indonesia are the major global exporters of desiccated coconut, accounting for 45 per cent of the exports (Table 4, Figure 6). Though India is the largest producer of raw coconut in the world, Desiccated Coconut export is only to the tune of one percent of the global exports. Nevertheless, during the year 2015-16 India exported 4261 MT Desiccated Coconut worth Rs 52.60 Crores. In comparison with the export of previous year, India achieved a remarkable increase to the tune of 63 percent.

Table 4. Quantity of DC exports in the world (in tonnes)	
Country	Quantity
India	5166
Indonesia	86797
Malaysia	9800
Philippines	109099
Sri Lanka	51132
Vietnam	40302
Others	134895
World	440983

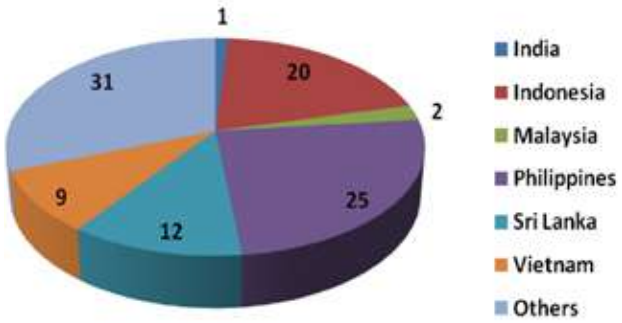


Fig 6. Percentage share of DC exports in the world

World export of Coconut milk/cream

Coconut milk and cream are high value commercial products for the higher end consumer market across the world. Coconut milk is an excellent substitute for the dairy milk and of late the health conscious consumer segment who are much aware of the comparative benefits of this product. Sri Lanka and Indonesia together contributes 96 per cent of total export share of coconut milk/cream and India is an insignificant player in this segment with an export share of meager 0.3 per cent (Table 5, Figure 7)

Table 5. quantity of exports of coconut milk/cream (in tonnes)	
Country	Quantity
Indonesia	19440
Philippines	1390
Samoa	100
Sri Lanka	17413
World	38343

World export of Coconut shell charcoal

The global market for activated carbon was estimated to be 1.25 million tonnes in 2012 and is expected to grow

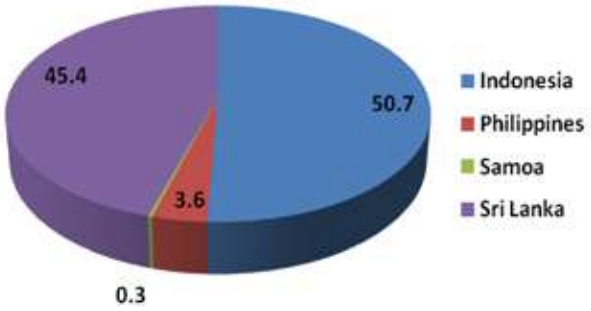


Fig 7. Percentage share of exports of coconut milk/cream

at a CGR of 11.7% from 2014 to 2020. Major activated coconut shell carbon exporting countries are shown in Table 6. Indonesia has almost monopolized the shell charcoal export market in the world with 70 per cent contribution of the total exports, while Philippines follows with 20 per cent share in the world exports (Figure 8). India too shows positive signals in the export segment of shell charcoal with a share of seven per cent in the total exports.

Table 6. Quantity of exports of coconut shell charcoal (in tonnes)

Country	Quantity
Philippines	72097
Sri Lanka	8736
Indonesia	249682
India	24773
World	355288

World export of coir and coir products

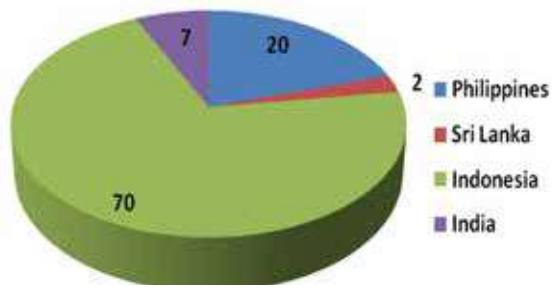


Fig 8. Percentage share of exports of coonut shell charcoal

Till recently, India and Sri Lanka were the only coir producing and exporting countries. In the recent past coir industry got established in few other countries as well (Philippines, Indonesia, Thailand, and Vietnam). Quantity of coir and coir products exported in the year 2014 is 0.33 million tones (Table 7). Around 80% of the export is in the form of coir fibre. China is the major buyer of coir fibre (90%) and its requirement is expected to increase 10 to 20% every year. At present, there is a deficit of nearly 20% in supply of coir fibre in the world.

Table 7. Quantity of exports of coir and coir products (in tonnes)

Country	Quantity
India	81738
Indonesia	31972
Malaysia	11877
Philippines	27834
Sri Lanka	137700
Thailand	39704
Others	196
World	331021

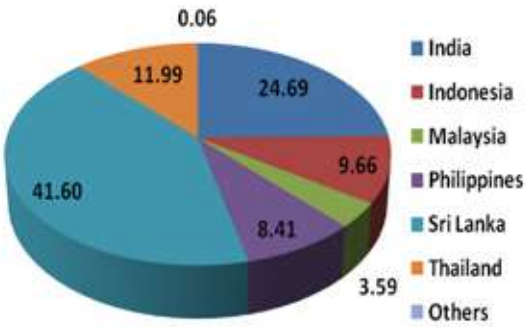


Fig 9. Percentage share of exports of coir and coir products

Global Competitiveness: India's position

It is evident that while considering the quantum of exports as well as value of export, India lags behind other major Asian traditional exporters like Philippines, Indonesia and Malaysia. It is also noteworthy that the consumption-production ratio of the above mentioned exporting countries are much lower than that of India thereby clearly reflecting the additional domestic surplus of coconut and coconut products in these countries. This scenario evokes adequate pressure for these countries to push their coconut products to other consuming countries. In turn these countries had developed a sort of professional export orientation and explored all possible export destinations across the world. In the case of India, the domestic consumption of coconuts and coconut products are much higher than the competing exporters (almost to the tune of 98% of the domestic production) and hence India had never developed an export orientation until the recent times when the Coconut Development Board has been bestowed with the status of Export Promotion Council. It is striking that in the recent period, the growth rate of exports of

coconut products from India has been accelerating, and India has a golden opportunity to take care of the food safety standards especially as it is in the nascent stage of export orientation. This aspect is important in the context of emerging food safety stringency in the developed countries and the surging consignment rejection of coconut products originating from Philippines, Indonesia and Malaysia. India, of late, due to the agglomeration of Coconut Producer Societies, Federations and Companies are in an advantageous position even in the case of scaling up of the production and exports of coconut products. In a nut shell, India is all set to compete with other traditional exporters and hopefully emerge as a winner.

Coconut: National scenario

India has produced 20440 million nuts in the year 2015 from an area of 1.97 million ha with a productivity of 10345 nuts per hectare (Table 8). It is predominantly cultivated in small and marginal holdings. Most of these holdings neither provide gainful employment opportunities for the family labour throughout the year nor generate sufficient income to meet the family requirement. Presently coconut growers are more exposed to economic risks and uncertainties owing to the high degree of price fluctuations. In this context it is needless to emphasize the importance of crop diversification in coconut gardens. For brightening the future prospects of a sustainable coconut sector, it is imperative to delink the sector from the over dependency on copra and coconut oil and enhance the production of diversified value added products.

Table 8. Coconut-National scenario

State	Area (000 ha)	Production (mn. nuts)	Productivity (nuts/ha)
Andhra Pradesh	106	1464	13808
Karnataka	515	5141	9982
Kerala	650	4897	7535
Tamil Nadu	465	6917	14873
Other States	240	2021	7295
India	1976	20440	10345

Source: CDB, 2015

Trade aspects of coconut

The export of coconut and coconut products from India recorded an increase of 13.5 per cent during 2014- 15, compared to the previous year (Table 9). The earnings from the export of coconut products, excluding coir and coir products was Rs 1312.38 crore during the period compared to Rs 1156.12 crore in 2013-14. The share of activated carbon in the total exports was Rs 558 crore during the year which was slightly lower than the preceding year, mainly due to the drop in coconut production. There was a decline in the export also due to the higher domestic price of shell charcoal, the raw material used for production of activated carbon, affecting the competitiveness of the product in the International market. The export of virgin coconut oil increased in both quantity and value (from Rs 4.81 crore in 2013-14 to Rs 24.72 crore during 2014-15). The export of coir and coir products touched a record high value of Rs. 1476 crores during 2013-14.

Table 9. Export of coconut products from India (2014-15)

Products	Quantity(mt)	Value (Rs. in lakhs)
Dry coconut	14895.63	19403.24
Other coconuts (fresh, dried, shredded, frozen etc.)		13584.45
Coconut oil	6935.53	14707.93
Virgin coconut oil	815.97	2472.93
Desiccated coconut	2606.34	4148.70
Copra	7869.42	8594.46
Shell charcoal	15030.90	44897.66
Activated carbon	54645.07	55780.19
Miscellaneous coconut products	---	7966.19
Total	---	131144.86

Source: Coconut Development Board, April 2015

Summing Up

Indian coconut sector has huge domestic demand, comparatively higher productivity, strong R &D support and technology delivery systems. In spite of these positive aspects, concerted efforts are lacking to effectively utilize the possible linkage between them for increasing the production and marketing efficiencies and enter the high value global chains. Sustainable coconut economy could only be achieved through integrated development of cultivation and industry coupled with a stable market. As far as the export markets of coconut value added products are concerned, India is comparatively a very small player with paltry export market shares. Indian export sector has become vibrant with very high growth rate since CDB has been upgraded to the status of Export Promotion Council (EPC). Moreover, in recent times due to the fast pace in urban life, there is considerable growth in the Indian confectionery industry (25 percent/ year). It is an indubitable fact that products like desiccated coconut and neera are high potential breakthrough products, which can bring in a paradigm shift in domestic coconut sector of India. Hence, there is tremendous potential in the domestic market as well. A meticulous plan to tap this potential would benefit the coconut industry in a big way. ■

Shri. Radha Mohan Singh, Agriculture Minister delivering the inaugural address during centenary celebration of CPCRI

Centenary of CPCRI celebrated

Shri Radha Mohan Singh, Union Minister of Agriculture and Farmers' Welfare, Government of India inaugurated the Centenary of ICAR-CPCRI, Kisan Mela, exhibition and the 3rd International Symposium on Coconut Research and Development (ISOCRAD-3) at ICAR-CPCRI Kasaragod on 10th December, 2016.

In his inaugural address, Shri Radha Mohan Singh elaborated on the various measures adopted by the government to solve the problems experienced by the farming community in the country. The benefits of implementing the schemes such as Pradhan Mantri Krishi Sichayee Yojana, Pradhan Mantri Fasal Bima Yojana, Distribution of Soil Health Cards etc were highlighted by the Union Minister.

Dr. Trilochan Mohapatra, Secretary, DARE & Director General ICAR, New Delhi delivered the introductory remarks. In his address Dr. Mohaptra highlighted the need to enhance agricultural production to meet the growing demand and the importance of value addition through product diversification for enhancing the income of farmers. He congratulated the scientists of CPCRI for the substantial number of technologies developed in the field of crop improvement, crop production, crop protection and product diversification pertaining to plantation crops and for the front line extension programmes conducted for disseminating the technologies to the farmers and other stakeholders.

Four publications viz. CPCRI – 100 years of scientific excellence, Harvesting Wisdom of Coconut Growers, Coconut and a special issue of Indian Horticulture magazine and a new product 'Kalpa Bar Chocolate' jointly developed by CPCRI and CAMPCO were released by Shri Radha Mohan Singh and Shri. E. Chandrasekharan, Minister of Revenue & Housing, Government of Kerala.

Shri P. Karunakaran, M.P., Kasaragod presided over the function. Shri. E. Chandrasekharan, Minister of Revenue & Housing, Government of Kerala, Shri Ananta

Dr. A.K. Singh, Chairman, CDB honoring an innovative coconut farmer.

Kumar Hegde, Member of Parliament, Uttara Kannada and Shri N.A. Nellikkunnu, MLA, Kasaragod, offered felicitations. Shri Sathishchandra, President CAMPCO, Dr A.K.Singh, Charman, CDB, Shri P.R. Muralidharan, Member, Coconut Development Board, Shri A.A.Jaleel, President, Mogral-Puthur grama panchayat and Shri P. Pradeep, Principal Agricultural Officer, Kasaragod were also present during the occasion. Dr. P. Chowdappa, Director, CPCRI welcomed the gathering and Dr. C.Thamban, Principal Scientist and Head, Division of Social Sciences, proposed vote of thanks.

100 innovative coconut growers from 12 states including Kerala, Tamil Nadu, Karnataka, Andhra Pradesh, Maharashtra, Goa, West Bengal, Assam, Lakshadweep, Andaman & Nichobar Islands, Orissa and Gujarat were honoured during the occasion. A scientist-farmer interface programme was conducted as part of the progarmme.

Coconut Development Board took part in the Centenary Expo which was organized at CPCRI, Kasaragod during 10-13 December 2016 in connection with the centenary celebrations. Shri Radha Mohan Singh, Hon'ble Union Minister of Agriculture and Farmers Welfare, Government of India inaugurated the exhibition. More than one hundred exhibition stalls covering research institutes, State Agricultural Universities, developmental organizations and inputs dealers participated in the exhibition. The Centenary Expo provided opportunity to farmers to procure various inputs and planting materials as well as other products from seed companies, nurseries, fertilizer and other input agencies, Kudumbashree mission etc. More than three thousand farmers and members of farmer organizations visited the Centenary Expo. ■

Courtesy :
Report - C.Thampan, D.Jaganathan and M.K Rajesh, CPCRI. Photographs - K Shyamaprasad and E R Asokan, CPCRI.

Shri. Radha Mohan Singh, Agriculture Minister in CDB stall. Dr. A.K Singh, Chairman is seen.

Shri. Radha Mohan Singh, Agriculture Minister planting coconut seedling in CPCRI premises

Voluminous Demand for Coconut Food Products in FOODEX SAUDI 2016 at Jeddah, Saudi Arabia

Mini Mathew, Publicity Officer and
R S Sengar, Assistant Director, CDB.

Coconut Development Board participated in Foodex Saudi 2016 at Jeddah, Saudi Arabia during 21st – 24th November 2016. Foodex Saudi is Saudi Arabia's leading international trade exhibition exclusively dedicated to the food and drink industry wherein 1000 brands of food products from over 35 countries are being promoted. Professional Saudi buyers from the mass distribution, retail manufacturers and hospitality industry had an opportunity to trade with exhibitors across the globe displaying wide range of food products especially from the countries such as Korea, Russia, Yemen, Lebanon, Afghanistan, Greece, UAE, Egypt, Spain, Uzbekistan, Pakistan etc. The Foodex Saudi featured a wide range of food products such as grains and seeds, raw materials, natural and organic food products, specialty products, sweets, snacks and bakery, canned and preserved foods, dairy, beverages etc. It is the only event in Saudi Arabia that brings all segments of food based industries together to trade and conduct successful businesses.

The fair was inaugurated by *His Royal Highness Prince Fahd bin Muqrin bin Abdulaziz Al Saud* of Saudi Arabia and the Indian pavilion was inaugurated by Mr. Mohammed Noor Rahman Sheik, Consul General of India. Dr.Shakil Ahammed IAS, Joint Secretary, MIDH, Shri. Ravindra Singh Sengar, Assistant Director, CDB and Smt. Mini Mathew, Publicity Officer, CDB represented Ministry of Agriculture & Farmers Welfare, Govt of India in the exhibition. Manufacturers of coconut products registered under CDB M/s Holista Tranzworld Pvt Ltd, M/s Keratech Pvt. Ltd and M/s Palakkad

Inauguration of Indian Pavilion by Mr. Mohammed Noor Rahman Sheik in the presence of Dr. Shakil Ahammed IAS, Joint Secretary, MIDH

CDB's pavilion in Saudi Foodex

Coconut Producer Company Ltd were represented by Ms. Smita Das, Shri. K.V. Mohanan and P. Vinodkumar respectively and showcased different value added products.

Jeddah city, situated on the coast of Red sea, is the major urban business centre of Saudi Arabia. It is the largest city in the Makkah province, the largest sea port on the Red sea and the second largest city in Saudi Arabia after capital city Riyadh. Jeddah is the major commercial hub in Saudi Arabia where 59% of the food consumption in GCC (Gulf Co-operation Council) takes place. The largest food and drink market in the GCC is having $4.5 billion worth fast food industry and $21.7 billion worth packaging industry. As part of awareness creation of variety of foods, countries such as Korea, Greece, Egypt, Afghanistan, Lebanon, Yemen, Turkmenistan and Pakistan had shown generosity to serve their traditional delicious ethnic foods free of cost in evening time at the venue of exhibition. Ladies from Greece, Lebanese and Yemen had wonderfully served food by keeping their own traditional etiquettes wearing the traditional dress. Every day there was preparation and serving of innovative items in the stall.

The Foodex Saudi 2016 provided an opportunity to create awareness about the health and wellness of coconut in the Kingdom of Saudi Arabia. Coconut Development Board had received a series of enquiries on various value added products especially on desiccated coconut powder, virgin coconut oil, neera honey, coconut sugar, tender coconut water, virgin coconut oil capsules, hair cream, milk and milk powder, coconut chips etc. The visitors especially from Saudi Arabian community are very confident about the goodness of coconut. They are aware of the health and wellness of coconut and there is very good scope for the export of coconut products in the Middle East. Even though Saudi Arabia is a land of date palms, coconut trees are grown ornamentally at the coastal area of Red sea near to Saudi King's Palace.

Thousands of visitors including traders from different categories viz wholesalers/importers, retailers/ supermarkets, distributors, suppliers, caterers, hotels, restaurants, food service providers, investors and Saudi families visited CDB's pavilion and enquired about the export possibility of different branded value added products of coconut. The Foodex Saudi gave an opportunity for Indian manufacturers of coconut products to explain about the natural and health aspects of coconut food products being manufactured by them. After seeing the goodness of virgin oil and neera depicted on the charts displayed in CDB's pavilion, lady visitors and families showed more interest in purchasing neera honey, virgin coconut oil capsule and hair cream. M/s Keratech had sold VCO capsules and VCO like hot cakes. United Gulf Corner Trading and Contracting

Coconut plants grown in Jeddah

Company Jeddah approached CDB stall with special intension to enter into trade with Indian companies.

Some of the Arab business communities have come forward for a joint venture of distribution and to setup integrated coconut based industry in Saudi Arabia by importing dehusked nuts from India so as to process one lakh nuts per day for making various products like VCO, D.C, Milk powder and activated carbon. Shri.K.V.Mohanan, Keratech, the manufacturer of coconut products revealed his experience that Falcon Trading company having their foundation in UAE and distribution channel in Saudi and other Gulf countries had visited the stall and expressed their interest in distributing Keratech products under the brand Virgin Plus in Saudi and UAE. Price negotiation and other terms and conditions are in progress", he said.

Smt. Smita Das, M/s Holista Tranzworld Pvt Ltd responded that regardless of how meticulously planned and thought of a marketing strategy, without showcasing the products, we can't get much attraction from importers. Coconut Development Board of India has provided the base platform to achieve a wide range of customer base in the kingdom of Saudi Arabia. "There is lot of scope for coconut based products in international market, so let's 'Make in India' by creating bench mark outside of our country". Out of the total 536 enquiries received by M/s Holista Company, 113 are potential enquiries. M/s Holista received more enquiries for products such as coconut oil, desiccated coconut, RBD coconut oil, coconut butter and virgin coconut oil.

Shri.P.Vinod Kumar, Palakkad Coconut Producer Company introduced Neera and Neera products to the traders especially neera honey, virgin coconut oil and neera sugar manufactured by FPO. He received bulk orders for honey and neera sugar.

Mr.M.V.A.Salim owner of MVA Group of companies and Mr.V.P.Mohammed Salim, JNH hospital group, Jeddah expressed their interest for entering into business ventures on coconut and sought the support of Coconut Development Board in this regard. Mr. Shailesh Sha, Director Jabs International requires bulk quantity of DC from Indian manufacturers. Lulu group of companies Jeddah has approached CDB to enter into trade with Indian coconut manufacturers. M/s A.M.H Alshaya Company W.L.L, Jeddah and M/s Kashif shaik, Marketing specialist, Jeddah have made trade enquiries for bulk quantity of tender coconut water.

Glimpses of Foodex Saudi 2016

Business Meet at Jeddah

As a curtain raiser of the exhibition, the Saudi Indian Business Network (SIBN), working under the aegis of the Consulate General of India had organized a B2B meet for 60 participating company delegates of Foodex Saudi 2016 in association with India Trade Promotion Organization (ITPO) at Indian Consulate hall at Jeddah. 45 business companies from India took part in the meet from food and beverage industry.

At the outset, Consul General of India Mohammed Noor Rahman Sheik appreciated the role of ITPO in the visit of Indian companies to the Foodex Saudi, 2016. The trade relation between India and the Kingdom goes back to several centuries and interaction between businessmen from both countries is gaining momentum for exploring the possibilities of establishing joint ventures and partnership. Indian manufacturers especially coconut product manufacturers gave brief of coconut products being promoted by them which attracted SIBN and other business groups.

"We are working towards giving a boost to the Indian food industry by encouraging more bilateral trade between the two nations in this sector." said Mohammed Shaid Alam, Deputy Consul General and Consul (Haj). Dr. Mohammed Nurul Hasan, Consul (Commerce), Anand Kumar, Consul (Consular), Mahesh Modi, Export & Corporate Manager of Sachchade Food Pvt. Ltd., Vijay Soni, SIBN treasurer and Zakaria Biladi, event manager of SIBN spoke on the occasion.

As part of concluding session of Foodex Saudi 2016, another business meet was arranged at the exhibition hall on 24th November under the leadership of Dr. Shakeel Ahamed IAS, Joint Secretary, Ministry of Agriculture, MIDH, Govt. of India. Dr. Shakeel Ahamed IAS emphasised the support being provided by Coconut Development Board for the promotion of coconut and coconut value added products all over the world. He briefed the schemes of Coconut Development Board especially TMOC schemes as part of promotion of value added products and also about the implementation of schemes through Farmer Producer Organizations in the country. The meeting evoked good response among participant traders and manufacturers. Participants requested for early resumption of arrangements with local support and sharing of trade data between trade bodies and Saudi Consulate. Dr. Shakeel Ahamed gave assurance that recommendation of the meeting would be taken to the knowledge of Ministry of Agriculture and Farmers Welfare Govt. of India and organizers of the Foodex event. He also stressed the need for initiating a trade relation by formulating WhatsApp group of entrepreneurs who attended the business meet. Abhishek Chouhan, Deputy Manager, ITPO has been entrusted for creating WhatsApp group.

Vaiga 2016

A five-day international workshop and expo on value addition of crops organized by the Department of Agriculture, Kerala was held at Kanakukunnu Palace, Thriuvanathapuram during 1- 5th December 2016. Honble Kerala Governor P Sathasivam inaugurated the programme. In this inaugural address the Honble Governor spoke on the need for giving access to farmers on the wide variety of technologies for value addition in agro-products. He added that farmers' access to the means and technology for value addition deserves serious attention. Agriculture Minister Shri. V S Sunil Kumar presided over the function. Agriculture Production Commissioner Shri. Raju Narayana Swamy IAS and Agriculture Director Shri. Biju Prabhakar also spoke during the occasion.

The five day workshop provided a platform for exchange of ideas on global trends and emerging technologies, marketing and investment opportunities in agro processing. The meeting provided exposure for entrepreneurs on production, machinery, financial aid, licensing, and certification. Experts from government agencies, research institutions and industry from the country and the Asia-Pacific region participated in the technical sessions held as part of the programme.The expo featured 200 stalls showcasing various crops such as jackfruit, coconut, tubers, paddy, honey, mushroom, spices, fruits, and vegetables as well as value-added products made by farmer groups.

Chief Minister of Kerala, Shri. Pinarayi Vijayan inaugurated the valedictory session. Coconut Development Board took part in the exhibition and displayed various coconut based value added products, informative posters and publications of the Board. Coconut Producer Companies and coconut product manufacturers displayed and sold their products in the Board's stall.

Dr. Shakeel P Ahammed IAS, Joint Secretary, MIDH reviewing the activities of CDB at Kera Bhavan, Kochi on 16th December 2016. Shri. Uron Salum, Executive Director, APCC is also seen.

Kisan Mela 2016

Coconut Development Board, Regional Office, Patna participated in Kisan Mela 2016 at Dr. Rajendra Prasad Central Agriculture University, PUSA, Samastipur, from 3rd to 5th December 2016. The mela was organised by Dr. Rajendra Prasad Central Agriculture University, PUSA, Samastipur, Bihar on the occasion of the birthday of first President of India Dr. Rajendra Prasad. Hon'ble Agriculture Minister, Shri. Radha Mohan Singh was the chief guest of the Kisan Mela 2016. Hon'ble Minister of State for Rural Development, Govt. of India, Shri Ramkripal Yadav and Shri Upendra Kushwaha ,Minister of State for Human Resource Development, Govt. Of India along with Shri Ramchandra Paswan, local MP Samastipur and Shri Ramesh Chandra Sriwastwa, Vice Chancellor, Dr. Rajendra Prasad Central Agriculture University were present during the occasion.

Various government and non government organizations participated in Kisan Mela 2016. Coconut Development Board, Regional Office, Patna displayed coconut based products and handicrafts items in the

Board's stall besides informative posters on coconut cultivation and industries coconut chips, coconut milk, coconut sugar, coconut neera, tender coconut, coconut honey, coconut jaggary, coconut milk shake, coconut snacks, virgin coconut oil, coconut natural hair cream, coconut desiccated powder, neera cookies etc.

India International Trade Fair

Shri R S Sengar, Assistant Director, CDB receiving the appreciation award for Board's stall in IITF

Coconut Development Board took part in India International Trade Fair at Pargati Madian held during 14th to 27th November, 2016. His Excellency Shri Pranab Mukherjee President of India inaugurated the exhibition on 14th November 2016. Coconut Development Board took part in the exhibition by displaying various coconut based value added products. 10 coconut based entrepreneurs displayed and sold their products and services in the stall. Visitors from all walks of life visited Board's stall and many reliable enquiries were received for coconut products. Enquiries on coconut cultivation in non traditional areas such as Bihar, Rajasthan, Chhattisgarh and Jharkhand were cleared by the Board officials. Coconut Development Board stall was awarded appreciation award by the IITPO. Shri R S Sengar, Assistant Director CDB MDIC New Delhi received the award on 27th November, 2016.

Indian Coconut products export recorded 50% growth

K.S. Sebastian, Assistant Director, Export Promotion, CDB.

Export of coconut products during April to November of the financial year 2016-17 touched Rs. 1446.80 crores recording a growth of 50.22% compared to the export during the corresponding period of the previous year. Significant increase was recorded in the export of desiccated coconut, coconut oil, fresh coconut, copra and coconut shell charcoal. Export of coconut products from India during April to November during the financial year 2016-17 is given in table 1.

Table1

Export of coconut products from India during April to November 2016

Sl. No.	Items	November 2015		November 2016		2015 (April to November)		2016 (April to November)	
		Qty (in MT)	Value (Rs. In lakhs)	Qty (in MT)	Value (Rs. In lakhs)	Cum. Qty (in MT)	Cum. Value (Rs. In lakhs)	Cum. Qty (in MT)	Cum.Value (Rs. In lakhs)
1	Activated Carbon	4109.47	4291.53	6400.00	6370.00	42311.92	43357.68	46532.19	46638.67
2	Coconut Oil	784.02	1490.12	7300.00	7400.00	5149.05	11448.07	30678.35	31855.54
3	Fresh coconut	3580.56	1385.30	10000.00	2200.00	22613.42	8989.31	68978.37	16015.80
4	Dry coconut	2437.98	2279.20	5000.00	3900.00	13377.68	13823.65	14433.80	12174.97
5	Desiccated Coconut	135.21	174.71	1350.00	1440.00	1458.33	2190.64	11044.50	11247.73
6	Copra	514.67	437.71	1580.00	950.00	2585.91	2281.82	14585.11	9418.85
7	Shell charcoal	1185.80	371.75	2660.00	590.00	6655.56	2220.26	18469.39	4549.62
8	Coconut Fatty Soap		214.04		274.68		1979.63		2243.45
9	Grated/sliced coconut	97.17	158.74	113.42	239.04	1393.83	2601.75	1128.54	2123.13
10	Coconut Hair Oil				135.36	.			1458.28
11	Virgin Coconut Oil	38.34	104.23	20.13	76.66	612.03	2002.60	320.73	1043.38
12	Oval coconut shell		32.42		93.34		596.49		817.41
13	Hair Cream		65.10		14.90		662.98		303.75
14	Coconut Water		30.73		19.77		498.87		297.19
15	Misc coconut products		382.82		296.25		3661.07		4492.34
	Total		11418.40		24000.00		96314.81		144680.10

Activated Carbon

The export of Activated Carbon from India during April to November 2016 was 46532.19 MT. United States was the leading importer of Indian Activated Carbon, followed by United Kingdom. Details of export of Activated Carbon from India during April to November 2016 is given in table 2

Export of AC from India during April to November 2016

Country	Quantity (in MT)	Value (Rs in lakhs)
United States	10544.32	10521.86
United Kingdom	3350.91	3299.25
South Korea	3111.32	3463.14
Germany	2472.05	2487.72
Sri Lanka	2302.57	2012.08
Netherlands	2211.42	2237.12
Russia	2168.84	2146.33
Turkey	1682.20	1356.77
Belgium	1466.51	1393.94
Canada	1345.13	1344.75

Estonia	1296.29	1260.54
China	1244.84	1666.17
South Africa	1122.43	1116.24
Italy	896.97	752.56
Ghana	820.21	908.11
Japan	755.91	996.23
Philippines	726.95	747.22
Peru	720.96	633.46
Tanzania	715.86	772.37
France	702.70	773.39
Taiwan	565.71	533.75
Thailand	552.15	551.18
Ecuador	462.63	456.00
Latvia	398.86	397.43
Australia	365.81	359.12
Surinam	306.10	312.13
Finland	304.48	210.21
Malaysia	276.13	310.09
Iran	257.63	263.12
Isreal	247.69	219.96
Senegal	234.68	260.28
Others	2901.93	2876.16
Total	46532.19	46638.67

Table 2 (quantity in %)

Coconut Oil

Export of coconut oil from India during April to November of the financial year 2016-17 was 30678.35 MT, which was 495.81% higher compared to 5149.05 MT recorded during the corresponding period of last year.

Malaysia, Indonesia, UAE, Sri Lanka, Myanmar and Saudi Arabia are the major countries exporting coconut oil from India. Export of coconut oil from India during the month of April to November 2016 is given in table 3.

(quantity in %)

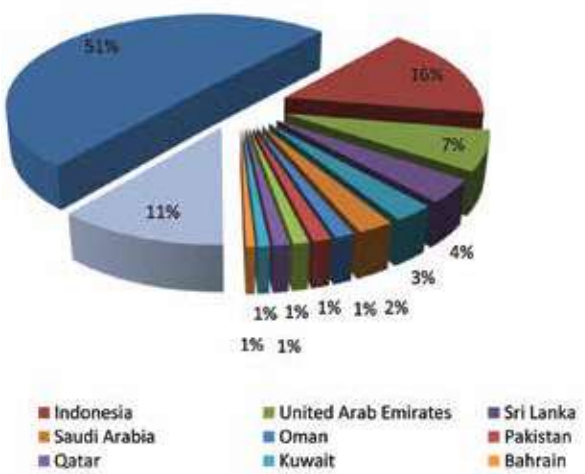


Table 3

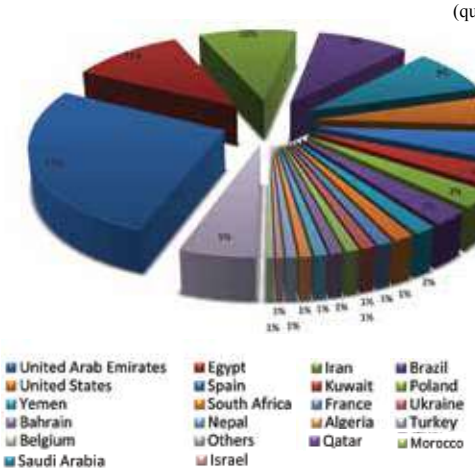
Export of coconut oil during April to November 2016		
Country	Quantity (in MT)	Value (Rs in lakhs)
Malaysia	15496.28	14368.88
Indonesia	4915.42	4340.75
United Arab Emirates	2095.65	2702.71
Sri Lanka	1190.74	1210.69
Myanmar	854.01	1020.30
Saudi Arabia	758.98	981.78
Oman	400.37	488.53
Pakistan	380.15	602.83
United States	328.93	780.67
Qatar	322.86	472.65
Kuwait	241.02	310.16
Bahrain	186.53	256.05
Others	3507.42	4319.54
Total	30678.35	31855.54

Desiccated Coconut

Export of desiccated coconut during April to November of the financial year 2016-17 was 11044.50 MT which was 657.34 % more than the desiccated coconut export during the corresponding period of last year. Export of desiccated coconut during the corresponding period of the previous year was 1458.33 MT. Country wise export of desiccated coconut powder during the period April to November 2016 is given in table 4. *Table 4*

Export of DC from India during April to November 2016		
Country	Quantity(in MT)	Value(Rs in lakhs)
United Arab Emirates	2955.21	2956.80
Egypt	1224.70	1193.97
Iran	1076.60	1103.08
Brazil	1011.66	1092.94
Saudi Arabia	905.99	935.15
United States	605.31	604.29
Spain	550.26	546.06
Kuwait	360.99	386.26
Poland	326.97	334.58
Qatar	293.21	304.54
Yemen	172.50	171.06
South Africa	156.08	159.73
France	116.20	130.16
Ukraine	109.37	114.60
Morocco	101.39	104.02
Bahrain	99.47	109.58
Nepal	98.36	108.37
Algeria	87.72	86.91
Turkey	85.44	68.84
Israel	58.10	62.50
Belgium	56.96	61.92
Others	592.01	612.38
Total	11044.50	11247.73

(quantity in %)



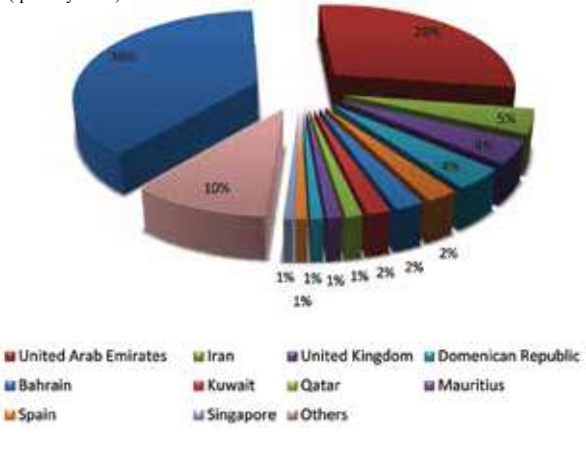
Fresh Coconut

Export of dehusked coconut from India during the period April to November 2016 was 68978.37 MT. Export of fresh coconut during the corresponding period of last year was only 22613.42 MT. Country-wise export of fresh coconut from India during this period is given in table 5.

Table 5

Export of fresh coconut during April to November 2016		
Country	Quantity (in MT)	Value (Rs in lakhs)
China	26077.23	5014.76
United Arab Emirates	19700.05	5423.52
Iran	3167.12	919.03
United Kingdom	2894.70	986.16
Domenican Republic	2672.83	653.94
Oman	1623.22	513.10
Bahrain	1478.12	405.44
Kuwait	1171.34	362.66
Qatar	842.25	294.90
Mauritius	738.73	209.74
Saudi Arabia	631.22	269.15
Spain	583.72	270.05
Singapore	449.90	104.24
Others	6947.95	589.11
Total	68978.37	16015.80

(quantity in %)



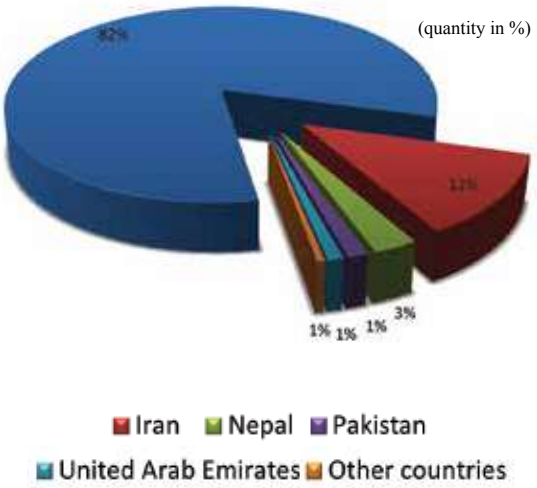
Copra

Export of copra from India from April to November 2016 was 14585.11 MT against export of 2585.91 MT recorded during the corresponding period of previous year. Country-wise export of copra from India during the period is given in table 6.

Table 6

Export of Copra during April to November 2016		
Country	Quantity (in MT)	Value (Rs in lakhs)
Bangladesh	11980.12	7696.56
Iran	1813.51	1131.19
Nepal	396.87	302.54
Pakistan	183.92	116.79
United Arab Emirates	140.19	88.58
Other countries	70.50	83.19
Total	14585.11	9418.85

(quantity in %)



Coconut Shell Charcoal

Export of coconut shell charcoal from India during April to November of the financial year 2016-17 was 18469.39MT which is 177.50% higher than the export during the corresponding period of the previous year. The export of coconut shell charcoal during the corresponding period of the previous year was 6655.56 MT only. Since the domestic price of coconut shell charcoal is very competitive and the product is covered under Merchandise Export from India Scheme (MEIS), the export is expected to increase in the coming months also. Country-wise export of coconut shell charcoal during the period is given in table 7.

(quantity in %)

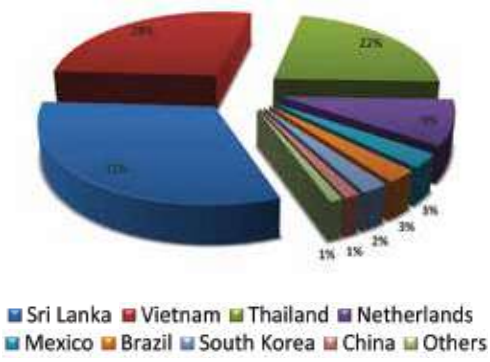


Table 7

Export of Coconut shell charcoal during April to November 2016		
Country	Quantity (in MT)	Value (Rs in lakhs)
Sri Lanka	5819.99	1459.58
Vietnam	5098.03	1153.88
Thailand	4056.18	880.66
Netherlands	1681.00	536.93
Mexico	514.03	162.90
Brazil	466.13	100.96
South Korea	410.06	119.80
China	232.48	54.66
Others	191.49	80.24
Total	18469.39	4549.62

During April to November of the financial year 2016-17, India imported Rs. 291.15 crores worth coconut products. Copra expeller cake and coconut fatty acid were the major items imported during this period. Details of import of coconut products into India during the period from April to November 2016 is given in table 8.

Import of coconut products to India during the period April to November 2016								
Item	November 2015		November 2016		April to November 2015		April to November 2016	
	Quantity (in MT)	Value (Rs. In lakhs)	Quantity (in MT)	Value (Rs. In lakhs)	Cum. Quantity (in MT)	Cum. Value (Rs. In lakhs)	Cum. Quantity (in MT)	Cum. Value (Rs. In lakhs)
Copra oil cake	6484.18	928.04	20000.00	3350.00	80520.12	12532.42	120982.17	19797.79
Coconut fatty acid	611.58	443.93	485.00	585.00	5322.79	4190.14	6395.72	6251.49
Coconut Cream-milk-powder		226.27		210.00		1011.75		1852.10
Coconut shell charcoal	1043.69	347.28	0.00	0.00	11269.59	3563.65	344.11	99.30
coconut oil	514.67	422.59		0.02	4479.60	3685.12	5.01	18.85
Copra	120.98	82.25	0.00	0.00	291.25	208.46	0.00	0.00
Misc coconut products		106.93		79.98		946.53		1095.37
Total		2557.29		4225.00		26138.06		29114.90

Table 8

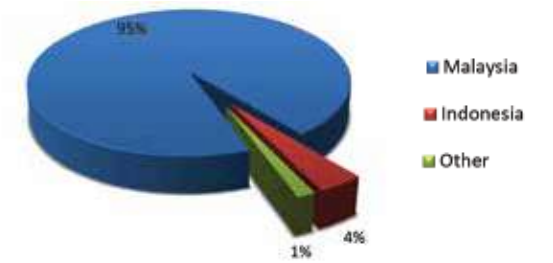
Coconut Fatty Acid

Import of coconut fatty acid into India during April to November of the financial year 2016-17 was 6395.72 MT, out of which 6050.61 MT was from Malaysia. Import of coconut fatty acid during the corresponding period of last year was 5322.79 MT. Details of import of coconut fatty acid to India from April to November 2016 is given in table 9.

Table 9

Import of coconut fatty acid during April to November 2016		
Country	Qty (in MT)	Value (Rs. In lakhs)
Malaysia	6050.61	5939.39
Indonesia	246.92	214.24
Other	98.19	97.86
Total	6395.72	6251.49

(quantity in %)



Copra expeller cake

In terms of quantity and value, copra expeller cake is the major coconut product imported to India. During April to November of the financial year 2016-17, the quantity of import of this product was 120982.17 MT of which 59423.52 MT was from Indonesia. Details of import during the period April to November 2016 is given in table 10.

(quantity in %)

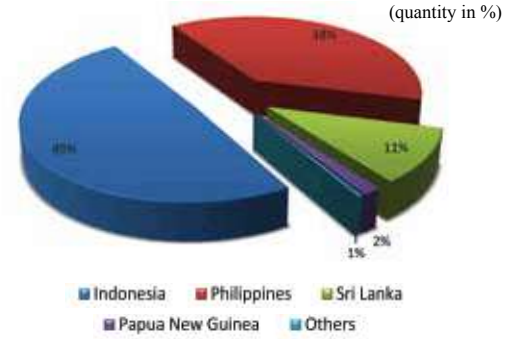


Table 10

Import of coconutoil cake during April to November 2016		
Country	Qty (in MT)	Value (Rs. In lakhs)
Indonesia	59423.52	9135.55
Philippines	46244.91	7820.59
Sri Lanka	13017.52	2436.66
Papua New Guinea	1832.14	330.21
Others	464.08	74.78
Total	120982.17	19797.79

Market review – November 2016

Domestic price

Coconut Oil

During November 2016 the price of coconut oil opened at Rs. 10100 per quintal at Kochi market, Rs.10100 per quintal at Alappuzha market and Rs.10500 per quintal at Kozhikode market and remained stable during the first week. During the second week, prices at Kochi and Alappuzha market experienced a slight downward trend. From the third week onwards prices in all markets picked up and depicted a positive trend by the end of the month.

The price of coconut oil closed at Rs.10700 per quintal at Kochi and Alappuzha market and Rs.10800 per quintal at Kozhikode market with a gain of Rs.600 per quintal at Kochi and Alappuzha market and Rs.300 per quintal at Kozhikode market.

Compared to the prices prevailed during the month of October which was Rs.10101 per quintal at Kochi, Rs.10000 per quintal at Alappuzha and Rs.10500 per quintal at Kozhikode market, the prices indicated an upward trend during November.

The price of coconut oil at Kangayam market in Tamilnadu, which opened at Rs.9133 per quintal expressed a declining trend in the first week, which continued till the second week. Prices expressed upward trend in third week and closed at Rs. 9200 per quintal with a gain of Rs 67 per quintal.

Table1: Weekly of price of coconut oil at major markets Rs/Quintal)

	Kochi	Alappuzha	Kozhikode	Kangayam
5.11.2016	10100	10100	10500	8967
12.11.2016	10100	10000	10500	8867
19.11.2016	NR	NR	10700	9333
26.11.2016	10700	10700	10800	9667
30.11.2016	10700	10700	10800	9200

Milling copra

The price of milling copra at major markets moved in tune with the prices of coconut oil. During the month the price opened at Rs.6650 per quintal at Kochi, Rs.6450 per quintal at Alappuzha and Rs.6550 per quintal at Kozhikode market expressed a steady movement during the first week. During the second week, the price declined slightly at Alappuzha market whereas the prices at other two markets ruled at the same level. From the third week onwards, prices at all markets expressed an upward trend. The price of Milling Copra closed at Rs.6950 at Kochi, Rs.6750 at Alappuzha and Rs.6950 at Kozhikode market with a gain of Rs.300 per quintal at Kochi and Alappuzha market and Rs.400 per quintal at Kozhikode market.

At Kangayam market in Tamilnadu, the prices opened at Rs.6200 and closed at Rs. 6400 per quintal with a gain of Rs.200 per quintal. Prices expressed a slight upward trend during the month compared to the previous month price which was closed at Rs.6300 per quintal.

Table2: Weekly price of Milling Copra at major markets (Rs/Quintal)

	Kochi	Alappuzha (Rasi Copra)	Kozhikode	Kan-gayam
5.11.2016	6650	6450	6550	6200
12.11.2016	6600	6400	6500	6000
19.11.2016	NR	NR	6800	6200
26.11.2016	6950	6750	6900	6450
30.11.2016	6950	6750	6950	6400

Edible copra

The price of Rajapur copra at Kozhikode market which opened at Rs.7550 per quintal expressed an erratic trend and the price closed at Rs.8000 with a gain of Rs.450 per quintal.

Table3 :Weekly of price of edible copra at Kozhikode market (Rs/Quintal)

5.11.2016	7500
12.11.2016	7000
19.11.2016	7600
26.11.2016	7500
30.11.2016	8000

Ball copra

The price of ball copra at Tiptur market opened at Rs.6651 per quintal, expressed a downward trend during the first fortnight of the month and from the third week onwards, prices expressed an upward trend. During the last week the prices expressed a downward trend and closed at Rs.6500 with a loss of Rs.151 per quintal.

Table 4 : Weekly of price of Ball copra at major markets in Karnataka (Rs/Quintal)	
	Tiptur
5.11.2016	6400
12.11.2016	5800
19.11.2016	6200
26.11.2016	6666
30.11.2016	6500

Dry coconut

At Kozhikode market the price of dry coconut opened at Rs.7100. The price remained steady during the first week of the month and during the second week a slight downfall was recorded. In the third week, price again expressed an upward trend, but declined by the end of fourth week. The price closed at Rs.7000 with a loss of Rs.100 per thousand nuts.

Table5 : Weekly of price of Dry Coconut at Kozhikode market (Rs/1000 coconuts)	
5.11.2016	7100
12.11.2016	7000
19.11.2016	7100
26.11.2016	7000
30.11.2016	7000

Coconut

At Nedumangad market price opened at Rs. 9000, increased to Rs.10000 per thousand nuts on 3rd day and ruled at same price till the end of the month. The price closed at Rs.10000 per thousand nuts with a gain of Rs.1000. At Arisikere market in Karnataka, frequent ups and downs in the price of partially dehusked coconut were observed. The price at this market opened at Rs. 9000 per thousand nuts and closed at Rs. 9900 with a gain of Rs.900 per thousand nuts. At Bangalore APMC, price opened at Rs.7500 per thousand nuts. The price declined during the first week and improved during the second week. Further in the third week a downward trend was observed. The price closed at Rs.8000 per thousand nuts with a gain of Rs.500 .At Manglore APMC market the price of partially dehusked coconut opened at Rs.14500 per thousand nuts was ruled steady throughout the month.

Table 6: Weekly of price of coconut at major markets (Rs /1000 coconuts)				
	Nedumangad	Arsikere	Banglore	Mangalore (Grade-1)
5.11.2016	10000	NR	7000	14500
12.11.2016	10000	NR	NR	NR
19.11.2016	10000	8250	8000	14500
26.11.2016	10000	10000	7500	13500
30.11.2016	10000	9900	8000	14500

Tender coconut

The price of tender coconut at Maddur APMC market in Karnataka opened at Rs.9000 per thousand nuts. The price increased to Rs. 9500 on 3rd and then to Rs.10000 on 4th. Thereafter it ruled at same price till the fourth week. But on the last day, a downward trend in price is recorded and closed at Rs.9000 per thousand nuts.

Table7 : Weekly of price of tender coconut at Maddur market (Rs/1000 coconuts)	
5.11.2016	10000
12.11.2016	10000
19.11.2016	10000
26.11.2016	10000
30.11.2016	9000

International price

Coconut oil

The international (CIF Rotterdam) and domestic price of coconut oil at Indonesia, Philippines and India expressed a slight fluctuating trend during the month. The international price of coconut oil expressed a slight upward trend by the end of the month. The domestic price of coconut oil in India opened at US$ 1514 and closed at 1561 per MT. The price of coconut oil quoted at different international/ domestic markets is given below.

Table 8: Weekly
Price coconut oil in major coconut oil producing countries
October 2016

	International Price(US$/MT)	Domestic Price(US$/MT)		
	Philippines/ Indonesia (CIF Europe)	Philippines	Indonesia Indonesia	India*
4.11.2016	1510	1454	1488	1514
11.11.2016	1580	1460	1546	1497
18.11.2016	1535	1533	1518	1545
25.11.2016	1595	1484	1563	1561

* Kochi Market

Copra

A slide in price of copra in major coconut producing countries was observed during the month, but the price of copra in India expressed a slight upward trend. Price of copra in Srilanka was the highest among all the major copra producing countries.

Table 9: Weekly Price of copra in major copra producing countries October 2016

	Domestic Price(US$/MT)			
	Philippines	Indonesia	Srilanka	India*
4.11.2016	871	881	1295	997
11.11.2016	873	898	NA	981
18.11.2016	874	839	1034	1008
25.11.2016	869	862	1080	1014

* Kochi Market

Desiccated coconut

The FOB price of desiccated coconut in India during the month of November was very competitive compared to the prices of major DC exporting countries.

Table 10: Weekly price of
desiccated coconut in October 2016

	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India*
4.11.2016	2387	2075	2236	1655
11.11.2016	2387	2100	NA	1478
18.11.2016	2387	2100	2125	1570
25.11.2016	2420	2100	2255	1610

*FOB

Coconut

In major coconut producing countries, only minute fluctuation in the prices of dehusked coconut was observed during the month. The domestic price of dehusked coconut in India was slightly higher compared to other major coconut producing countries.

Table 11: Weekly price of dehusked coconut
with water during October 2016

Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India*
4.11.2016	206	222	201	270
11.11.2016	203	217	NA	262
18.11.2016	210	219	NA	254
25.11.2016	209	222	202	270

*Pollachi market

Coconut shell charcoal

The FOB price of coconut shell charcoal in India expressed a slight fluctuating trend during the month, but seemed to be competitive during the month. Srilanka's price was the highest among major coconut shell charcoal exporting countries.

Table 12: Weekly price of coconut
shell charcoal during October 2016

Date	Domestic Price(US$/MT)			
	Philippines	Indonesia	Srilanka	India
4.11.2016	340	390	432	372
11.11.2016	340	390	432	331
18.11.2016	340	390	431	301
25.11.2016	340	390	431	327

*FOB

Monthly operations- January

Andaman & Nicobar Islands: Irrigate the palms. The frequency of irrigation and quantity of water depends on the type of soil and the method of irrigation.

Andhra Pradesh: Clean the crowns of the palms. Search for leaf eating caterpillar and destroy the affected leaves by cutting and burning. Detect the palms affected by Ganoderma wilt and drench the plant basin with calixin 5 per cent or aureofunginsol by dissolving 1 g aureofungin + 1 g. copper sulphate in 5 litres of water. The same treatment is to be repeated after 15 days. Isolate the disease affected palm by taking isolation trench around the palm. The healthy palms in the immediate vicinity of diseased palms should be treated similarly with the above solution to prevent further spread of the disease. If attack of the mite is noticed, spray neem oil - garlic - soap emulsion 2 percent or azadiractin @ 4ml per litre or root feed azadiractin @ 7.5 ml with equal quantity of water. Under rainfed condition a light ploughing may be done. Start irrigating the palms.

Assam: Continue irrigation. Attend to intercultural operations around the palm. Continue collection of seednuts from the selected mother palms and store them in a cool dry place. Apply pond silt to coconut garden. Start digging pits of 1m x 1m x 1m size in the main field at a spacing of 8m x 8m in square system for transplanting of seedlings.

Bihar / Madhya Pradesh/ Chhattisgarh: Clean the crowns of the palms. Continue irrigation. If there is scarcity of water, adopt drip irrigation. Keep the basins of palms weed free. Provide shade to the newly planted seedlings. Mulch the basins of the palms with dried leaves. Apply tank silt/ forest soil/ compost in coconut gardens. Apply blitox @ 5g/litre or Dithane M 45 @ 2g/litre on the crown and bunches to avoid secondary infections due to cold injury.

Karnataka: Irrigate the palms regularly. Under drip system 60-70 litres of water per palm per day may be given. Raise suitable intercrops under irrigated conditions. If leaf spot disease is noticed spray the leaves with one per cent bordeaux mixture. If the palms are affected by leaf eating caterpillar cut and burn the severely affected leaves. Spray the underneath of leaves with 0.05 m per cent malathion or 0.02 per cent dichlorvos. Release parasites of suitable stage. If spraying has been done release the parasites only after 15 days in the pest prone areas. If the attack of the mite is noticed, spray neem oil - garlic – soap emulsion 2 percent (20 ml neem oil + 20 gm garlic emulsion + 5 gm soap in 1 litre water) or azadirachtin @ 4ml per litre or root feed azadiractin @ 7.5 ml with equal quantity of water. Plough the land and destroy weeds under rainfed conditions.

Kerala/Lakshadweep: Irrigate young seedlings and adult palms. Clean the crowns of palms. Cut and remove all the senile and unproductive palms from the garden. Continue the prophylactic spraying either with bordeaux mixture or any other copper fungicides available in the market. If the attack of leaf eating caterpillar is noticed, spray the under surface of affected leaves with 0.02 per cent dichlorvos or malathion. Select mother palms for seednut collection. Start irrigation. If mite infestation is noticed clean the crowns of the palms and spray neem oil - garlic - soap emulsion 2 percent or azadiractin @ 4ml per litre or root feed azadiractin @ 7.5 ml with equal quantity of water.

Maharashtra/Goa/Gujarat: Clean the crowns of the palms by removing dead and decaying matter. Spray the crowns with one per cent bordeaux mixture if fungal diseases are noticed. If the attack of leaf eating caterpillar is severe, cut and remove all the affected leaves and spray the lower side of the leaves with 0.05 per cent malathion or 0.02 per cent dichlorvos. Release parasites only after 15 days of spraying.

Orissa: Seasonal intercrops may be sown. Irrigate coconut and the intercrops. Incorporate green manure. Coconut basins may be mulched with coir pith/ husk etc.

Plant protection chemicals may be applied according to the pest/ disease. If the attack of eriophyid mite is noticed root feed azadirachtin 5 per cent @7.5 ml with equal quantity of water. Clean the crown. Continue other maintenance operations to the intercrops as well as coconut.

Tamil Nadu/Puducherry: Clean the crowns of the palms. If rain is not received in early January, start the regular irrigation. Treat the stem bleeding affected palms by applying coaltar or bordeaux paste after removing the affected tissues. Dig isolation trenches of 1m deep and 50cm wide, 2 meters away from the base of the palms affected by Thanjavur wilt. Apply 5kg neem cake per palm per year. Drench the basins with 40 litres of one per cent bordeaux mixture per palm. Treat the palms with 100 ml calixin 5 per cent through root feeding at quarterly intervals for one year. In areas where mite infestation is noticed, spray neem oil - garlic - soap emulsion 2 percent (20 ml neem oil + 20 gm garlic emulsion + 5 gm soap in 1 litre water) or azadiractin @ 4ml per litre or root feed azadiractin @ 7.5 ml with equal quantity of water especially on the perianth region of buttons and affected nuts.

Tripura: Irrigate the palms at an interval of 3-4 days. The basins of each palm should be mulched with leaves, to reduce the loss of soil moisture. Before mulching, drench the basins with chlorpyriphos 0.05 per cent to avoid the attack of termites. Provide partial shade to new plants to protect from scorching. One per cent bordeaux mixture or any other copper fungicide may be sprayed to protect the palms from bud rot or leaf rot.

West Bengal: Continue harvesting of nuts. Start irrigating young seedlings in the field as well as in nursery and provide shade. Select mother palms for seednut collection. ■