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Message from the Chairman's Desk

Dear friends,

Value addition in agriculture attains great priority at a time when the Government is pursing active measures to increase the farmer's income. It starts right from post harvest handling and primary level processing and goes up to the final packaging and marketing of the finished product for direct consumption by the consumer. Needless to say, development of the industry has to go hand in hand with development in cultivation to help farmers realize remunerative returns. That explains why Coconut Development Board has been promoting processing and value addition of coconut through facilitation of development of technology for value addition, promotion of entrepreneurship and market promotion.

The Board has been organizing a series of seminars for creating awareness on coconut processing and developing entrepreneurship in the coconut sector. We are continuing our collaborations with pioneer institutes like Indian Institute of Food Processing Technology (IIFPT), Thanjavoor to take the technology to the doorsteps of the entrepreneurs and farmers. The recently held seminar conducted on the 15th of February is a great initiative towards making a frontal assault on the problems of rural India like unemployment and poverty by putting our brains and efforts together to ensure that, the standard of living of the farmers are improved by leaps and bounds.

CDB is also working in association with institutions like ICAR - CPCRI, Kasargod for the use of artificial intelligence in agriculture by utilizing the concept of neural networks which will help in early detection of pest and diseases. The ultimate objective of the Board is doubling of farmer's income by the year 2022. Hence technology and innovation coupled with marketing is of utmost importance in the way forward of Coconut Development Board.

Marketing is another important area where focused attention is given to stabilize the market position for coconut products. At a time when the western world has generated increased demand for coconut products owing to its nutritional and health benefits, we have to raise the quality of our processed products to global standards. India has consolidated its position as an exporter of coconut products during the last decade but we still have a long way to go. Major coconut growing countries like Indonesia, Philippines, Thailand, Malaysia and Sri Lanka are much ahead of us. Apart from the Buyer Seller meets organized with an objective to develop and consolidate the prospects for coconut products in the domestic market, active measures are being undertaken for export promotion. The Board facilitated participation of entrepreneurs in Biofach, Germany which is a prestigious trade fair for organic products. Entrepreneurs were also facilitated for participation in SIAL, Paris and in Gulfood, Dubai. An Exporters Seminar was organized at Coimbatore on the 22nd of February where senior officials from the Director General of Foreign trade (DGFT), Federation of Indian Export Organisations (FIEO), Export Credit Guarantee Corporation (ECGC), Department of GST and Central Excise and Customs gave an overview of the export procedures and clarified the doubts of the exporters. Another seminar for exporters is planned at Bengaluru during the first week of March. Through these efforts, CDB has succeeded in establishing the backward and forward linkages through establishing tie up between the producer farmers and the consumers.

Jawaharlal Nehru, the first Prime Minister of India once said: "Everything else can wait, but not agriculture." This must be the motto for the progress of India for agriculture may account for just 17% of India's wealth but it accounts for close to 60% of employment generation. The time has therefore come to recognize agriculture as an enterprise based on principles of profit. A second green revolution is the need of the hour and that must be an income generation nay an income revolution. Let us bring about a value addition revolution in agriculture through the Kalpavriksha. CDB's collaborations with premier institutions will definitely pave the way for a massive adoption of various value addition techniques in the coconut sector. I earnestly seek the wholehearted support of one and all in this noble endeavour.

Dr. Raju Narayana Swamy IAS
Chairman

Farm conservation and utilisation of coconut diversity

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Coconut, *cocos nucifera L.*, is a mono-typic genus and an important crop of tropical world. Evolved and adapted along the coastal ecosystem in tropical world, coconut spread to other regions subsequently with human assistance and became part of human culture. Various uses of coconut to mankind and the long history of cultivation obliterate the marks of its origin and diversification. Dispersal of coconut has been aided by both nature and man, through ocean currents and human movements in prehistoric times. Its spread in coastal regions and islands can be attributed to ocean currents while the dissemination hinterland definitely required human interventions. Along its spread to various geographical situations and adaptation to the conditions, there was a gradual accumulation of phenotypic diversity. Origin of coconut is still a debated matter. It is generally accepted that coconut originated either in Central American region or in islands of Indian or Pacific Ocean.

Two major forms of coconut developed during the evolutionary process are tall types and dwarf types based on the plant height (Narayana and John 1949, Menon and Pandalai 1958). Tall is the commonly cultivated type for copra and oil. Dwarf types are generally used for tender nut water, avenue planting or ornamental purposes. Other two major types identified in coconut are the niu vai and niu kafa types based on fruit morphology. Niu kafa type, considered as wild, has triangular fruit with high husk content and small nut inside. Niu vai types, with round fruits with low husk content and large nut

inside containing large quantity of liquid endosperm are considered as advanced cultivars developed under human selection (Harries 1978; Samsudeen *et al* 2006). Both niu vai and niu kafa types are identified in tall population. Dwarf types are known to produce niu vai type fruits but not niu kafa type fruits.

Major products of coconut, beside copra and oil, are desiccated coconut, tender nut water and coir. Other products include copra meal, shell charcoal, activated carbon, cocochemicals (fatty acids, fatty alcohol, methyl ether), coconut wood, fibre products, coconut cream, coconut milk, coconut powder, coconut chips and nata de coco. The inflorescence sap, known popularly as 'neera', has been creating a lot of interest among farmers and consumers recently and emerging as a health cum sports drink of natural origin. Coconut today is being positioned as a food, nutraceutical and industrial crop rather than oil crop.

Today, coconut is cultivated in 12.3 million hectares in 94 countries producing 62.5 million tons of nuts equivalent of 10 million tons in copra or six million tons in oil (FAOSTAT 2014). Approximately 96% of coconut area is cultivated by 10 million smallholder farm families with farm holdings less than four hectare and more than 80 million people depend on coconut for their livelihood (FAO 2001). In India, coconut is cultivated in 18 states and three Union Territories under 2.16 million ha for the production of 15.08 million tons (Indiastat database 2015). The four southern states of Kerala, Karnataka, Tamil Nadu and Andhra Pradesh account for 90% of area under coconut and 93% of production. Rest of the production comes from Maharashtra, Orissa, Pondicherry, Andaman & Nicobar, Lakshadweep, Gujarat, Goa, West Bengal and non-traditional states like Bihar, Assam, Tripura, Nagaland, Manipur, Meghalaya, Arunachal Pradesh and Chhattisgarh.

Evidences suggest that coconut reached the Indian subcontinent early in history. Recent discovery of 65 million year old fossil fruit resembling coconut (world's oldest fossil record of coconut) from Ghansor in Seoni district of Madhya Pradesh suggests origin of coconut in the Indian subcontinent (Srivastava and Srivastava 2014). Diversity in tall as well as dwarf populations found in India along the west and east coast supports the theory of coconut origin from India. Andaman Nicobar Islands and Lakshadweep Islands are rich resources of coconut genetic diversity. Kerala is the traditional coconut growing state where coconut is closely associated with social and religious life. Diverse ecological conditions prevailing in Kerala

resulted in adaptation of suitable coconut population in those conditions. Ecologically adapted coconut populations (ecotypes) are found throughout Kerala, many of which have been documented. However, the ecotype diversity has been obscured by the human interference (movement of genetic material in and out of ecological niches) and delineating these ecotypes has become extremely difficult.

The ecotypes described from Kerala include both tall and dwarf types. Generally, ecotypes are named based on the geographical locations where they are located. Major tall forms reported from Kerala are Bedakam, Annur, Kuttiyadi, Jappanam, Komadan, Neduvarayan and Kappadam. Major dwarf forms reported from Kerala includes Chowghat Orange Dwarf, Chowghat Green Dwarf and Chowghat Yellow Dwarf. These ecotypes are developed as a result of continuous farming activity and selection by man and nature. Coconut is found only as a cultivated form and has no wild relatives. Long juvenile period and long productive life makes coconut genetic resource management unique. Generation time (average time between two consecutive generations in the lineages of a population) in coconut is 15 – 20 years. It takes many years for a coconut population adapt to a particular geographical location. Many generations of farmers are involved in one coconut population getting adapted to a location. Conservation of coconut genetic diversity is farmer driven. Most of the ecotypes are identified and named by farmers. *In situ* characterization, cataloguing and on farm conservation with farmer participation is most

appropriate model for management of coconut genetic resources. Inventories of coconut ecotypes are the prerequisite in this model. A few ecotypes from Kerala are described here.

West Coast Tall (WCT)

WCT is the coconut population adapted to west coast of India especially the Kerala coast. It is a very sturdy palm adapted well to the coastal ecosystem yielding beyond 100 years. The palms flowers in 6-7 years in open condition.

Kuttiyadi ecotype

This variety of coconut population is adapted to hilly region in Kozhikode district of Kerala. It is a very sturdy palm adapted well to the midland ecosystem yielding beyond 100 years. The palm flowers in 6-7 years in open condition. Seeds of this cultivar germinate in 120 – 180 days. Kuttiyadi ecotype has longer inflorescences compared to WCT. Length and number of spikelets, number of female flowers and number of nuts/year are more in WCT compared to Kuttiyadi ecotype. Husk content and oil percentage in copra are higher in Kuttiyadi compared to WCT.

Bedakam ecotype

This ecotype is found on the eastern part of Kasaragod district. Bedakam ecotype can be described as intermediate in height having spherical crown, slender trunk, close leaf scars, less than 28 leaves on the crown, spaciously arranged leaflets, spaciously arranged spikelets, more than 46% husk, fruit length to breadth ratio 1.2, thick shell and thin endosperm.

Annur ecotype

This variety of coconut population is adapted to coastal area of Kannur district. It is adapted well to the coastal sandy soil yielding beyond 100 years. The palm flowers in 6-7 years in open condition. Seeds of this cultivar germinate in 120 – 180 days.

Jappanam ecotype

Jappanam ecotype is located in Alleppey district of Kerala state. The ecotype has large fruits, large nuts, thick shell and thick endosperm. Farmers are of the opinion that the palms are not susceptible to root (wilt).

Kappadam Tall

Kappadam Tall, an ecotype from coast of Kerala, is also known as 'Chappadan' in some parts of Kerala. Compared to the other varieties from west coast populations, this cultivar produces heavier larger fruits with thinner husk. The fruits of this selection are predominantly green, oblong to round in shape. The palms shows clear bole on the stem. The leaves are longer with broader and longer leaflets. The palm starts flowering between the 6^{th} to 7^{th} year after planting and produces large inflorescences. The average fruit weight is around 1200 g, with husked fruit weight of about 800 g. The kernel weight ranges from 400 to 550g with 215 to 280g of copra per nut.

Puvar ecotype

The Puvar ecotype is long fruited,with long fibre. They yield one and a half times more fibre than other types. The fibre is more than 30cm in length. The ecotype has large endosperm content. It gives 200 to 250 gram copra per nut. Oil percentage is about 70.

Chowghat Orange Dwarf

Chowghat Orange Dwarf is the most common dwarf coconut cultivated in India. Found sparsely cultivated throughout the west coast region of India, particularly in the Chavakkad area of Thrissur district of Kerala. The palm has a thin stem with closely arranged leaf scars, a small compact crown with characteristic orange colour on leaf petioles, inflorescences and fruits. This is an early flowering cultivar and takes about 3-4 years for initial flowering. This is largely a self-pollinating cultivar. The palms of this variety are sensitive to moisture stress and also show alternate bearing habit. The

fruits are small with an average weight of 634 g per fruit and average copra content of 128 g/nut and 66 % oil. The variety Chowghat Orange Dwarf was found to have the highest total sugar content in tender nut water. The tender nut water of fruit of 7^{th} month is sweet with a total sugar content of 7.0 g/100 ml and sodium and potassium contents of 20 ppm and 2000 ppm, respectively and organoleptically graded as 'very good'.

Chowghat Green Dwarf

Chowghat Green Dwarf gets its name from the green coloured fruit and it was first identified from Chavakkad region in Kerala. The palms are early flowering and take about 2.5 to 3 years for flowering. The leaf petioles, leaves and nuts are dark green in colour. The fruits are oblong in shape and have a characteristic 'beak' when fully mature. The palm attains a height of around 4 m at 20 years of age. It is generally grown for tender nut purpose as it contains very sweet nut water. The tender nut water has total sugars of about 4.80 g/ml, average potassium content of 2150 ppm and average sodium content of 22.40 ppm. The palms are very sensitive to biotic stress and need plant protection measures against major pests particularly red palm weevil when large scale commercial plantings are adopted.

Chowghat Yellow Dwarf

Chowghat Yellow Dwarf is another variant of dwarf coconut from Chavakkad area in Kerala. The palms are scarcely distributed among the coconut populations in the area. The Chowghat Yellow Dwarf has erect leaves, large sized nuts with higher tender nut water and higher nut yields. The number of fruits per bunch range from 12 to 20. The palms are characterized by stem girth of 55 cm at 1 m from ground and an average leaf length of 3.45 m at the age of 30. The bunch production is regular and ranges from 9 to 13 bunch per year. The colour of the fruit is yellow, oval shape with an average fruit length of 37 cm and average fruit breadth of 16.5 cm. Tender nuts of this cultivar contain more sweet water ranging from 250 to 340 ml per nut with average TSS of about 6.7^{o} Brix.

Farmer participatory characterisation of coconut diversity

Genetic diversity is very important to sustain the productivity of a crop. In coconut, diversity provides characters for yield, adaptation, disease resistance, high value uses and characters. Rich diversity of coconut varieties is observed in farmers' fields, which have not been reached by the traditional research methods employed for crop improvement in coconut. Farmer participatory approaches are important to characterize and to utilize the coconut genetic diversity for the sustainable production of coconut and enhancing income of farmers.

An initiative for the participatory analysis of coconut situation by the local coconut growers conducted under COGENT/IPGRI sponsored project implemented by Central Plantation Crops Research

Institute (CPCRI) on "Developing coconut based income generating technologies in poor rural communities" in Pallikkara village in Kasaragod District, Kerala State and Ariyankuppam village in Pondichery. Farmer participatory methods were employed to understand the coconut cultivation scenario and to analyse the coconut diversity in farmers' gardens. PRA tools such as transect walk, resource mapping and seasonal calendar were employed to analyse the land use, local agro-ecology, problems and opportunities in the coconut community. Through matrix ranking farmers were facilitated to characterize and evaluate the coconut varieties found in their community. Coconut Diversity Fair was organised in the communities to facilitate the coconut growers to gather together in a common place, exhibit the different varieties of coconut grown in their gardens, study their preferences for varieties and analyse various criteria for characterizing and evaluating the varieties.

Altogether 12 diverse coconut types, six in Pallikkara and six in Ariyankuppam coconut communities were identified and their significant characteristics were documented. 'Sevvelanir' was one special coconut ecotype documented in Ariyamkuppam coconut community. 'Sevvelanir' in Tamil language means red tender nut. This is a special ecotype present in the locality, the tender nut of which when cut open the husk at the top portion shows a unique pink colour and hence the local people call it sevvelanir. The tender nut water is very sweet and local people believe that the tender nut water has the medicinal property to cure jaundice and asthma. The palms are tall and produce medium sized light green nuts. Only very few palms of sevvelanir tall are present in the locality.

The farmer participatory characterisation of coconut varieties in two coconut communities, one in the west coast and the other in the east coast in India, revealed the genetic diversity of coconut present in farmers' gardens. Further, the analysis also yielded information on the preference of farmers about the desirable traits of coconut varieties. (Thamban et al 2007). In the farmer participatory survey and study of varietal diversity and profitability of coconut in Kerala by IPGRI/COGENT funded by IFAD it was revealed that farmers value hybrids for the traits of early bearing and high production potential in terms of nuts when facilities for better management are available whereas under average and below average management level preference is for local tall variety (Thampan, 1999). It is important that coconut breeders take into account the performance of coconut varieties in farmers' field and also the varietal preference of coconut growers while formulating coconut breeding programmes.

Management and utilisation of coconut diversity

Conservation of biodiversity is essential to the sustainable development and human survival. Coconut (Cocos nucifera L.) is an integral part of agricultural biodiversity in its natural home for many centuries and has been closely associated with human culture as food, medicine, cosmetics, in construction, in rituals and in social life. Development activities and non-profitability of coconut cultivation are driving the coconut out of cultivation leading to erosion of coconut genetic resources and indigenous knowledge associated with it. It is imperative that such resources and knowledge associated with are documented and protected for the benefit of future generations.

As a result of many uses and preferences by local people, different ecotypes have emerged through the selection both by man and nature. West coast of Kerala is a natural home to coconut. It is a narrow strip of land between the Western Ghats and the Arabian Sea and ranges from 50 to 100 km in width. The region with numerous rivers and backwaters inundating the land sustains unique ecosystems. Selection coupled with adaptation lead to the development of many local ecotypes in coconut along the region. Identification, characterization, documentation and conservation of this genetic diversity are crucial for future breeding programs.

Supporting the maintenance of diversity on farm is one strategy for crop genetic diversity conservation. On farm conservation is viewed as a complementary strategy to ex situ conservation strategies. Through on farm conservation not only the materials, but also the processes of evolution, adaptation of crops to their environment and traditional knowledge associated with the crop are conserved by studying traditional identification and nomenclature processes one can understand the way in which coconut diversity is perceived and understood by indigenous people. Documentation of diversity and its association with people is prerequisite to develop on farm conservation programs.

Ethno botanical approach aim to document, describe and explain complex relationships between cultures and uses of plants. This field of study

State level honour for Friend of Coconut Tree

The success story of Arunraj of Kannur district is indeed a good model to emulate for the typical Keralities who always dreams for white collar jobs. Arunraj had undergone the FoCT training programme of CDB conducted by the Tejaswini CPC, Kannur and was continuing in the job eventhough his team mates left the job in between. Arunraj couldn't complete his graduation due to various reasons. In the morning hours he takes up rubber tapping and after that he goes for coconut harvesting and other plant protection operations. Arunraj had attended the FoCT training to do the harvesting of the palms in his own homestead garden. On realizing the prospects of this job, he decided to undertake this as his means of living and now is earning around Rs. 1000-1500 per day.

On getting to knowing about the state level palm climbing competition, he took part in the competition and came out with the first position

which carried a cash price of Rs.25,000 and gold medal.The recognition has transformed the life of Arunraj and he is being honoured at his native for this prestigious achievement since he is the first person from his village to receive such accolades. Arunraj received the award from Mr. V S Sunilkumar, Hon'ble Agriculture Minister, Kerala during the Vaiga- Krishi Unnathi Mela in Thrissur.

analyzes the results of indigenous manipulations of plant material together with the cultural context in which plants are used. Coconut has a long history of human association. Man had used coconut in many ways resulting in a large number of products and knowledge associated with it. Most of these products and knowledge are location or region specific linked to the culture of the land. Documentation of these products and knowledge help in the sustainable use of coconut genetic diversity and promoting coconut as a food for nutrition, health care and environmental services to safeguard the interest of millions of people and their livelihoods.

Conclusion

There is tremendous scope for utilizing the genetic diversity of coconut available in farmers' fields for providing various options and opportunities while formulating strategies for solving the problems of coconut farmers. A thorough understanding about the coconut diversity available in farmers' gardens would enable the stakeholders to utilize the germplasm for sustainable production of coconut and enhancing income of farmers.

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Hot spot areas of coconut slug caterpillar and its integrated management in Andhra Pradesh

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In Andhra Pradesh East Godavari, West Godavari, Srikakulam and Visakapatanam are important coconut growing coastal districts . One of the major factors that contribute to the loss of production and productivity in coconut is the damage due to the insect pests particularly coconut leaf eating caterpillars . In the major coconut growing districts viz., East and West Godavari districts the incidence of coconut slug caterpillar, *Macroplectra nararia* is being observed on a severe scale in various areas around the hot spot regions (Table 1) .

Damage

The damaging stage of the pest is caterpillar. Early instar caterpillars cause leaf spots due to feeding on the leaf tissue. Grown up caterpillars eat away entire laminar portion of the leaf leaving the mid ribs. Some times, balls of excreta will be seen as a layer on the ground around the coconut palm basin. In severe out break, the pest invades nuts and even leaf stalks. Drying of entire foliage, drooping of leaves and bunches, falling of buttons and nuts are ultimate symptoms of pest attack. The pest was observed

Slug caterpillar affected coconut garden

causing damage even to intercrops like banana/cocoa and surrounding hedge plants like agave after drying of coconut crop. In such cases falling of buttons and nuts, drying of total foliage leads to severe yield losses and spathe emergence will be delayed till the palm recovers.

Integrated management of slug caterpillar

Biological Control

During high incidence of slug caterpillar in East Godavari district in January 2013 two new larval parasitoids of coconut slug caterpillar *M.nararia; Euplectrus sp* and *Euplectromorpha sp* belonging to family *Eulophidae (Hymenoptera)* were identified (NBAII, Bengaluru) along with a pupal parasitoid *Eurytoma tatipakensis* (IARI, New Delhi). In March 2015 again severe incidence of slug caterpillar was observed in various villages in Tanuku ,Veeravasaram and Palakoderu mandals of West Godavari district and Rajanagaram mandal of East Godavari district of Andhra Pradesh and a new larval parasitoid *Pediobius imbrues (Hymenoptera: Eulophidae)* with a natural incidence ranging from 2-10 % was observed on the slug caterpillars in the pest affected gardens in these districts . Laboratory observations on the parasitisation of P. imbrues on slug caterpillar revealed that slug caterpillar larvae (0.6 to 0.8cm size) were effectively paralysed with in 48 to 72 hours and egg laying with 3 to 4 eggs in each paralysed larvae was observed . On caterpillars of earlier instars (less than 0.6 to 0.8cm size) and late instars (size above one cm) even though stinging and paralysation was observed no egg laying was recorded. Emergence of parasitoids progeny was observed from 12 to 15 days after parasitisation. Under laboratory conditions longevity of P. imbrues parasitoids ranged from 60 to 70 days.

Field Evaluation studies

The preliminary field efficacy study of P. imbrues (reared as hyper parasitoid on B.hebetor at biocontrol lab, H.R.S., Ambajipeta) on coconut slug caterpillar *M.nararia* was carried in Derbarevu village , Narsapuram Mandal in West Godavari district of A.P in one ha area of coconut garden affected by slug caterpillar in April 2017. Out of 150 palms affected by slug caterpillar 10 per cent of palms were sampled and from each palm 10 leaf lets from lower whorl were collected (total 150 leaflets) and 1400 numbers of P. imbrues parasitoids/ palm (Totaling to 21000 numbers) were released in the

Slug damage individual palm

Slug caterpillar larave parsitised by P.imbrues in lab

garden on 21.04.2017 and 01.05.2017. The per cent natural parasitisation of slug caterpillar by different parsitoids P.imbrues , Euplectrus sp and Euplectromorpha sp.was 2.10, 2.31 and 1.68 per cent before release of P.imbreus and after release the percent parasitisation of slug caterpillar by P.imbreus increased to 30.33 and 41.41 per cent exhibiting a significant effect on the population of M.nararia . The P. imbrues release did not affect the percent natural parasitisation by Euplectrus sp and Euplectromorpha sp and parasitisation by these two parasitoids on slug caterpillar also increased consequent to release of P. imbrues

Studies on impact of light traps on slug caterpillar

Many of the insect species, mostly nocturnal, are known to be positively phototropic and attracted towards artificial light in large numbers.

Table 1 : Hot spot regions of Coconut slug caterpillar Macroplectra nararia infestation in East and West Godavari districts of Andhra Pradesh (2009- 2018)

	2009	2010	2012	2013	2014	2015	2016	2017	2018
Villages in East Godavari	Kadiyam	--	Kothapeta	Kothapeta	--	Kothapeta	Kothapeta	Kothapeta	
	Atreyapuram	--	Atreyapuram	Atreyapuram	Atreyapuram	--	Anthervedi	--	
		Ambajipeta	Ambajipeta	--	--	Ambajipeta	Ambajipeta	Ambajipeta	
	Sakhinetipalli	Sakhinetipalli	Aalamuru	Sakhinetipalli	--	--	Sakhinetipalli	--	
	Mamidikuduru	Mamidikuduru	I.Polavaram			I.Polavaram			
	Aallavaram	Aallavaram	Thallarevu		Alamuru	K.ganga-varam	Alamuru		Thallarevu
	Mumidivaram		Malkipuram	Malkipuram		Rajanaga-ram	Amalapuram	Amalapuram	
							Mummidivaram		
			Ravulapalem				Ravulapalem	Allavaram	
	P.Gannavaram						P.Gannavaram		
							Malkipuram	Malkipuram	
	Razole						Razole	Razole	Razole
						Uppalagup-tam	Uppalaguptam		
Villages in West Godavari	Palakoderu			Palakoderu	Palakoderu	Palakoderu		Tadepalligudem	
	Narsapuram	Narsapuram	Narsapuram	Narsapuram	Tadepalligudem	Pedavegi		Narsapuram	
	Palakollu	Palakollu	Palakollu	Undi		Palakollu	Palakollu	Palakollu	Palakollu
	Polamuru	Poduru		Yelamanchili	Poduru	Atthili	Poduru		
	Veeravasaram			Penumantra		Veerav-asaram	Achanta	Veeravasaram	
	Yelamanchili					Ganapa-varam	Yelamanchili	Yelamanchili	
			Undrajavaram			Penuman-tra		Undrajavaram	Bhima-varam
			Rambilli (Visakha patanam district)		Nakkapalli (Visakha patanam district)	Tanuku			

Active participation by farmer friends in Light trap experiments

Adult moths trapped by light traps

In plantations of coconut where application of pesticides is laborious use of light traps holds much promise against out break pests like slug caterpillar. The studies with light traps against the slug caterpillar revealed the following facts.

- Among the various light traps with different light intensities tested against, coconut slug adult moths M .nararia 200 W Incandescent bulb is the best light intensity bulb treatment and trapped highest number of moth catches and was followed by 500 W Incandescent bulb .
- Cumulative results of the studies with best intensity light source 200 W in candescent bulb different types and heights of light traps viz., 1 ½' above + sticky trap, 1 ½' above + Water pan, 4' above+ window bucket and 10' above+ window bucket at all five experimental sites revealed that more moth catches were observed in the trap installed at 1 ½' above + Water pan trap and was followed by 1 ½' above + sticky trap .
- Studies with the number of traps to be installed for effective trapping viz., one trap/ha., two traps/ ha. and three traps/ ha. with best intensity light source and best trapping method (200 W incandescent bulb 1 ½' above + Water pan) studied at all the experimental sites revealed that installation of three traps/ ha has trapped highest numbers of adult moths as compared to two and one trap/ha
- The standard light traps i.e., U.V. light trap (Metallic) and U.V. light trap (Acrylic) when tested for their efficacy in attracting slug adult moths were also found to be effective in trapping the moths .
- Regarding male and female moth catches more number of female moths were attracted to the light traps in comparison to the male moths .
- Studies on peak time of moth attraction towards the light source revealed that moths got attracted from 19.00 hours onwards and attained peak in between 21.00 to 01.00 hours and gradually decreased to nil at 03.00 hours.

Based on above observations and results of effective parasitisation of slug caterpillar by P. imbrues even under field conditions it can be inferred that P. imbrues is a primary parasitoid on slug caterpillar M. nararia in coconut plantations .Therefore mass multiplication and releasing of P. imbrues in coconut slug caterpillar out break areas and installation of lights traps is highly profitable as it is difficult to adopt chemical control measures for the management of this pest due to the residual toxicity and limitations of large scale adoption of pesticidal recommendations. ■

Coconut Water -
Why does it feel so good?

"Coconut water is sweet in taste, promotes digestion and clear the urinary path," says Ayurveda. Coconut water is a relatively clear liquid that looks more like water which is sweet and tasty and is a favorite beverage among Asian and Pacific Islanders. In addition to natural sugars, it contains an array of vitamins and minerals, which make it a nutritious beverage. It is high in potassium, chlorides, calcium, and magnesium, with a modest amount of sodium, sugar, and protein. It is essentially fat-free. While the mineral content remains fairly constant, the sugar and protein concentrations increase as the nut matures.

Coconut water contains a variety of nutrients including trace minerals which most other foods lack. In many small islands, coconut water is the only potable water available. For these reasons coconut water has been a life saver for many people and has been referred to as the "fluid of life."

The electrolyte profile of coconut water is somewhat similar to human plasma and for that reason it has been used by doctors as an intravenous solution and injected directly into the bloodstream to prevent dehydration. When freshly extracted from the coconut, this liquid is free from germs and parasites. Doctors working in tropical climates have often used the water from coconuts as IV solutions, a common practice during world war 2 and in Vietnam where commercial IV solutions were often in short supply. Water from unopened coconut is uncontaminated by bacteria, fungi, or other pathogens. Therefore, if properly prepared, it can be given intravenously without fear of introducing microorganisms. Recent research on the use of coconut water as an intravenous fluid has shown it to compare favorable with commercial solutions. Coconut water does not harm red blood cells, is non-allergenic, and is readily accepted by the body. It is considered a safe and useful means of rehydration,

A buko a day keeps the Urologist away

Buko is Filipino word for young fresh coconut. The above quote was inscribed on the back of the name card handed to me by Dr Macalalag, a Urologist, nearly 30 years ago at a Coconut Conference in Philippines.

He presented scientific findings on the health benefits of coconut water from energy drink, hydration, healthy reproductive system, prevents prostrate problems to fragmenting kidney stones. It was also reportedly used as the alternate to IV fluid during the two world wars when supplies ran out, as it was the only sterile energy water found in the jungle, preserved by nature.

Various cultures use it in different forms, yet all uses are for good health. Some even cook fresh young coconut as in the picture. Karkars cook on open fire the whole young nut but without the water. It is very tasty, healthy & delicious!

Coconut is God's wonderful gift to Humanity. Enjoy it!

Indonesians warm and slightly cook the young tender coconut with lemon grass in the water for health eating. In my home we dehusk young coconut, drink fresh water then char-grill the whole nut over the fire for a delicious tasting coconut meat which is also very healthy.

Coconut water with a bit of flakes which is flesh, warm it up and turn to alkaline water which can even kill cancer cells buy drinking it

Uron Salum, Excecutive Director, International Coconut Community, Jakartha

particularly when a patient suffers from potassium deficiency. In fact, coconut water has been shown to be just as effective as commercial electrolyte solutions in prolonging survival time in sick patients. Researchers have demonstrated that coconut water can be given through intravenous infusion by as much as one fourth to one third of the patients body weight without complications.

Coconut water is also highly recommended as a means for oral rehydration. The water has been useful in tropical areas to overcome diarrheal dehydration. Diarrhea is a major health problem in many third world countries. In the Philippines it ranks second among the causes of death and illness and kills nearly five million children yearly. Excessive physical activity can also cause dehydration. Athletes and sports enthusiasts use coconut water to replenish electrolytes lost in perspiration. It works just as well as and even better than some popular commercial sports drinks. Coconut water is a natural sports drink.

The taste of coconut water varies depending

on the age of the coconut. The water from mature coconuts, although good, doesn't compare. Unfortunately, unless you live where coconuts are grown, it is difficult to get green coconuts. Until recently, just about the only way to get coconut water was to crack open a coconut. The demand for a natural sports drink has led to commercial packaging of young coconut water. It is now available in many locations in bottled and tetra pak containers.

Coconut water is more than just a sports drink or nutritive beverage. It is a health tonic. Research has shown that it has a positive effect on cholesterol. In one case study, for example, blood cholesterol levels of HDL (good) cholesterol increased by 46.2percent. The researchers indicated that liver cholesterol levels were reduced by 26.3percent and risk of atherosclerosis (hardening of the arteries) decreased by 41.1 percent. Their conclusion was that coconut water is a natural, nutritious drink that could help prevent the formation of atherosclerosis.

Coconut water has long been known for its therapeutic effect on the urinary and reproductive systems. It is reported to clear bladder infections, remove kidney stones and improve sexual virility. Medical research has shown consumption of coconut water to be very effective in dissolving kidney stones. Dr Eugenio Macalalag, director of the urology department at the Chinese General Hospital in the Philippines, says that coconut water has demonstrated its effectiveness in patients suffering from kidney and urethral stone problems. His patients have been able to suspend dialysis treatment after regular oral intake of coconut water. In the Philippines coconut water is commonly known as buko juice. Dr. Macalalag has also reported success in patients by directly infusing the water into the kidneys. He calls the treatment bukolysis. A saying that has now become popular in the Philippines is: "A coconut a day keeps the urologist away."

Properties of Coconut Water

Reduces problems for infants with intestinal disturbances.
Is an effective oral rehydration medium.
Contains organic compounds possessing growth-promoting properties.
Keeps the body cool.
Prevents prickly heat and summer boils and relieves rashes caused by small pox, chicken pox, measles, etc.
Kills intestinal worms.
Presence of saline and albumen makes it a good drink in cholera cases.
Checks urinary infections.
Excellent tonic for the old and sick.
Cures malnourishment.
Diuretic.
Dissolves kidney and urethral stones.
Useful as an intravenous solution.
Useful as blood plasma substitute and is readily accepted by the body.
Aids the quick absorption of drugs and makes their peak concentration in the blood easier by its electrolyte effect.
Urinary antiseptic
Eliminates poisons in case of mineral poisoning

Coconut water injected through urethral catheters inserted up to where the stones are lodged (bukolysis) has resulted in significant daily decrease in size, disintegration of the stones and expulsion without the need for surgery. Even by oral intake coconut water, taken 2 or 3 times a week, has been observed to result in significant size reduction of kidney stones within a short time. Macalalag reports that, of his 1,670 patients who were recurrent stone formers and who took buko therapy, only 13 percent had recurrence of stones in a 10 year period, and the stones were small and passed out easily. Coconut water therapy is so effective that kidney stone patients are spared going through expensive medical procedures. Dr. Macalalag jokingly complains that because of this he has suffered from "AIDS" or what he calls "acute income deficiency syndrome."

Coconut water is a natural diuretic so it increases urine flow. This helps to dilute the urine so that stones are less likely to form and helps to flush existing stones out. It is also helpful in preventing bladder infections.

Not only does coconut water clean out the urinary tract, it revitalizes the reproductive system. Coconut water from fresh green coconuts is reputed to increase libido and enhance performance. Coconut water could be useful for those who have glaucoma. Glaucoma occurs when fluid pressure in the eye becomes abnormally high, causing damage to tiny blood vessels and optic nerve fibers. If left untreated, glaucoma can lead to permanent loss of vision. There is no cure for glaucoma; all that can be done is to prevent it from worsening. Treatment consists of putting medication in the eye to relieve the pressure. medicated eye drops must be used on a regular basis to keep fluid pressure under control. Coconut water has proven to be effective in significantly reducing fluid pressure in the eyes.The water is not put in the eyes but taken orally. The effect lasts for $2^1/_2$ hours.

In addition, coconut water has shown to act as an antioxidant, scavenging many types of destructive free radicals and protecting hemoglobin in the blood from nitrite-induced oxidation. These effects are most significant when using fresh coconut water. They diminish significantly when the water is heated or processed.

A traditional method for treating cataract involves the use of coconut water. Several drops of coconut water are put into the eyes, a hot damp washcloth is placed over the eyes, the patient then lies down with the washcloth in place for 10 minutes. Many people are getting good results with this procedure. Perhaps part of the reason it may work is due to the antioxidant effect of coconut water. Cataracts are caused by oxidation so the antioxidant effect of the water might be of some help.

Coconut water has its own biologicals: enzymes, nucleotides, active polypeptides, and growth factors. Studies on growth factors in coconuts go back to 1941 when the Dutch plant physiologist Johannes Van Oberbeek saw the effect of the coconut water on the growth of a plant embryo. Oberbeek discovered that the plant's baby cells grew faster when coconut water was added to the culture medium -just like mother's milk helps babies grow. The growth slowed down when the water was removed. ■ *Courtesy: https://cocotap.com/*

Value addition, the only alternative for making coconut farming remunerative: Dr. Raju Narayana Swamy IAS

Value addition is the only alternative for making farming prospective, said Dr. Raju Narayana Swamy IAS, Chairman, CDB while inaugurating the nata de coco plant set up by the Nata Nutrico Coconut Food Products, Kannur. This is the first modern unit of its kind established in the Kinfra Park, Kannur manufacturing coconut water based nata de coco. Unfortunately majority of our farmers are still below the poverty line. Eventhough 60 % of the Indians are employed in agriculture sector, the resource from the sector is below 17%. Value addition is the only alternative to make a shift to this situation, said Dr. Narayana Swamy. He apprecited Mr. Abdulla for the innovative step taken forward by M/s. Nata Nutrico Coconut Products. He thanked M/s. Kinfra for extending the infrastructure facilities for setting up the unit.

Feild view of CDB, DSP farm. Kondagoan

Potentiality of Coconut in non-traditional Bastar Zone of Chhattisgarh

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Introduction

Chhattisgarh lies within 17045' to 20034' N latitude and 80015' to 82015' E longitude with an altitude ranging from 550 to 850 meters above mean sea level (MSL). The State covers a geographical area of 1,37,360 sq km. Nearly 65.9 % of the total area is covered by tribals and hence it is often said as a tribal dominated state. The 'Bastar Plateau Zone' of Chhattisgarh includes the districts viz., Bastar (Jagdalpur), Bijapur, Dantewada, Kanker, Kondagaon, Narayanpur and Sukma. This zone includes the Dandakaranya region, plains of Mahanadi, Indravati and Sabri rivers tract, which are separated by the hills of Abujhmar, Bailadila, Tikampalli, Usoor and Gola-palli and is surrounded by the states of Maharashtra, Andhra Pradesh and Odisha on three sides. Except Indravati river plains, most of the area is covered by evergreen dense reserve forests and hilly tracts. The major landforms are high-level plateaus, structural hills and valleys and pediments and pediplains. The sub agro-ecological region of Bastar Plateau includes the North Lowland, Keshkal Escarpment, Abujhmad Hills, North-East Plateau, Southern Plateau and Southern Lowland.

The region has a sub-tropical monsoon climate with three distinct seasons i.e. summer, monsoon and winter. The southwest monsoon starts from June and continues till middle of September, winter season spreads from October to February whereas; summer season extends from March to middle of June. Rainfall is the major source of ground water recharge in the area and receives maximum (85%) rainfall during the southwest monsoon season. The winter rainfall is meagre (10-15%). The zone receives high rainfall coupled with comparatively lower temperatures and higher humidity. The average

Field view of Shailesh Atami Kasoli (Dantewada)

Shri Ganga Ram Karanji (Jagdalpur)

annual rainfall (mean of 50 years) ranges from 1200 to 1600 mm mostly received from June to September with its peak in July and August. The maximum and minimum temperatures during peak summer and winter touch upto 43^0C and 5^0C, respectively. The soil of Bastar region is mostly Entisol, Inceptisol and Alfisol wherein organic material like FYM or compost improves the water retention and storage capacity of soil with a pH range between 5.5 and 6.8. Such conditions promote the probability of raising horticultural and plantation crops in the area.

Present status of coconut

Chhattisgarh covers nearly 1561 ha under coconut with an annual production of nearly 126.17 lakh nuts out of which 1289 ha area is covered by the Bastar zone. The areas under Bastar Plateau *viz.*, Jagdalpur, Kondagaon, Narayanpur and Kanker along with Dhamtari accounts for nearly 81.61 per cent of the total area and 93.32 per cent of the total production of coconut in the State. Bastar region of Chhattisgarh is a non-traditional coconut growing area yet there is tremendous scope of its production and exploration in the area. The quality factors of planting palms in non-traditional areas mainly depend on selection of seed nuts, storing, time of sowing, method of sowing, irrigation source, weeding etc. But with the advent of time the farming community of the region has started adopting the cultivation of coconut as one of the component of their faming system.

Coconut is mainly planted in the bunds and borders in Bastar region. The area under the crop is increasing rapidly in Chhattisgarh by regular research approaches, activities, farmer training programmes and government efforts that are continuously increasing the farmer's active participation and interest in the crop. With the advent of time more farmers are getting involved in coconut farming in their farming system. According to Ministry of Agriculture and Farmers Welfare, GOI (2019) during the last 5 years there is an increase of approximately 500 ha area under coconut in the tribal belt of Bastar region. The maximum area expansion has taken place in the Narayanpur district followed by Kondagaon. The feasibility of soil and agro climatic conditions promotes the growth and vigour of the plant which is now attracting the farmers to raise the crop in their farming system and growing intercrops in between the spaces. Matured nuts are mainly consumed in the zone.

Potential area available for area expansion and utilization of coconut

Present area under coconut in the Bastar division is given in the Table 1. By looking into the data, there is no authenticity of the data over the period of years for Chhattisgarh state. Hence, it needs to be re-looked into the area of coconut in the state and in Bastar division in particular.

In the near future nearly 1800 ha area can be brought under coconut cultivation. Matured nuts are mainly consumed in the zone (Table 1), mainly as a component crops in the existing cropping system of the region. Hence encouragement should be given for bund planting in the area where irrigation facility exists.

In the region, coconut is mainly used for religious, culinary and tendernut purpose and usage as a oil for food consumption is not noticed. There is no coconut processing unit in the Bastar zone till date. However, as the area is expanding some mini oil

Shri Kaudi Ram Dewangan, Bhanpuri (Bastar)

Shri Peelu Ram, Tahkapal (Jagdalpur)

Table 1: Land use and potential area for coconut in Bastar Division

S. No.	District	Geo-phraphi-cal area (ha)	Net sown area (ha)	Double cropping (ha)	Total area (ha)	Area under coconut (ha)*	Potential area for expan-sion of coconut (ha)
1.	Bastar	392092	169723	5863	175586	261	500
2.	Bijapur	655296	64890	39	64929	14	50
3.	Dantewada	341050	99712	1412	101124	32	250
4.	Kanker	643268	209906	16437	226343	172	250
5.	Kondagaon	605073	137010	6834	143844	671	450
6.	Narayanpur	692268	31522	317	31839	121	250
7.	Sukma	576702	104479	1067	105546	18	50
To-tal	3905749	817242	31969	849211	1289	1800	

Commissioner Land Records, Raipur, Govt of Chhattisgarh, 2017 & * Ministry of Agriculture and Farmers Welfare, Government of India (2019)

processing units should be established in the zone to utilize the nuts for extraction of oil as well as virgin coconut oil production apart from using the nuts for value added products. The marketed oil is mainly imported to the zone which usually increases its cost. If oil processing units will be established in the zone it will help to meet the requirement of oil in the local market and would also help in the consumption of the produced nuts besides creating employment generation for the tribal youth.

Success story of coconut planting

Apart from being a tribal dominated area, Bastar is often considered as a naxal affected and sensitive zone of Chhattisgarh. The initial approach of convincing the rural youth is the major factor that determines the possibilities of raising any crop in the farmer's field. Most of the rural population being illiterate and staying in remote areas are not interested in changing their cropping pattern easily. But due to the constant efforts of the researches and scientists working in the area, recently few farmers have taken up the cultivation of coconut as part of their farming system. By frequent trainings they are taught about the modernization in farming that is now-a-days convincing them to adapt the technologies that could help them improve their standard of living. One of the most progressive coconut growing farmers of the area is Shri Shailesh Atami from Kasoli (Dantewada). Due to the constant guidance of scientists and research officials he has planted nearly 500 coconut seedlings in his field and growing banana as intercrop. In near future he is planing to plant another 500 coconut seedlings in his farm. Being a non-traditional area this figure matters a lot to generate the interest of other growers as well to raise coconut in their farming areas as mostly coconut is grown in the bunds in Bastar. Similarly another resourceful farmer is Shri Kaudi Ram Dewangan who has raised nearly 110 coconut seedlings in his field and is interested in increasing its number in near future. These farmers are growing other fruits and vegetables as intercrops in the coconut field. There are many farmers also who have planted coconut seedlings on similar lines (Table 2). There is ample scope for area expansion in the region and there is greater role of the AICRP on Palms centre and CDB, DSP Farm for providing quality seedlings and necessary guidance regarding the planting and management of coconut gardens.

Shri Roop Singh Madawi Bhanpuri (Bastar)

Shri shalesh Atami Kasoli (Dantewada)

Table 2: Progressive coconut growing farmers of Bastar

S. No.	Name of farmers	Place	No. of seed-lings
1.	Shri Shailesh Atami	Kasoli (Dantewada)	500
2.	Shri Kaudi Ram Dewangan	Bhanpuri (Bastar)	110
3.	Shri Peelu Ram	Tahkapal (Jag-dalpur)	50
4.	Shri Roop Singh Mandawi	Bhanpuri (Bastar)	50
5.	Shri Ganga Ram	Karanji (Jagdalpur)	55
6.	Shri Raju Chauhan	Jagdalpur	80
7.	Kamal Kishore Kashyap	Bade Chakwa	50
8.	Somaru Mourya	Chokar	80
9.	Shyam Ghan	Tahkapal	50
10.	Dharam das	Jamawada	60
11.	Tulsi	Bakawand	50

Fertilizers now in capsule form along with micro nutrients

Abe Jacob,
Deputy Editor, CDB, Kochi -11

Libin and Rohit are basically engineers who have turned into agriculture entrepreneurship due to their common interest to farming. The duos stated their joint venture in 2017 December and in February 2018 has started marketing the maiden product christened 'Banana Agri Blossom' a micro nutrient fertilizer mixture for banana. The product was purchased and used by around 1500 farmers within six months of its launch. The product was also well received in the National Banana Festival held in Trivandrum, Kerala. The good response received from the farmers added to the confidence of the duo and enthused them to move forward with better confidence. The team was one among the 100 farmer entrepreneur teams who participated in a meeting convened by the Hon'ble Prime Minister of india.

Fertilizers for coconut including NPK is now available in capsule form in Kerala, Tamilnadu, Karnataka and Andhra Pradesh .Here is the success story of two educated youngsters who have ventured into the marketing of fertilizer in capsule form and the micro nutrients in packets for coconut and its various intercrops like pepper, banana and ginger.

The initial concept was online marketing of organic manures. Once they were into it and after getting to know of it, they turned to be distributors and later on a start up entrepreneurship was started.

It was in 2018 August that the team started M/s. R L Co Innovative Agri Private Limited, an independent entreprenurship and became the first official dealer of bio capsule in Kerala. The company is the sole distributor of the capsule in Tamilnadu, Karnataka and Andhra Pradesh. The participation in the international Vaiga festival held at Thrissur, Kerala opened up newer avenues for the product. The company is supplying good quality planting material since January 2019. Good quality planting material of high yielding turmeric varieties, Pragati and Pratibha developed by Indian Institute of Spices Research.The future prospects of Libin and Rohith is to create awareness on agriculture among the general public and to promote organic farming .

The Bio capsule

Indian Institute of Spices Research (IISR), has developed the technology for producing capsules of NPK Trichoderma, PGPR and pseudomonas which enhances the growth of the plant, develops disease resistance and provides better yield. This was in 2015 and the objective of the scientists of IISR while developing this technology was to increase the productivity and disease resistance of spice crops like cardamom and pepper. RLCo is distributing the bio capsules produced with this technology through a renowned manufacturer.

This is in fact a good initiative for the coconut farmers . The capsule form of NPK Trichoderma, PGPR and pseudomonas brings down the production cost to a greater extent.

NPK Bio capsule

NPK Bio capsule contains acetobacter for nitrogen, phosphate solubilizing bacteria for phosphate and potassium mobilizing bacteria for potassium. This gives ample nutrients for the crop and also helps in getting better yield. The capsule costs @ Rs. 360 and three capsules are enough for one acre plot.

Trichoderma Capsule

This capsule helps in controlling the fungal attacks in the root of the crops. The capsule costs @ Rs. 100 and five capsules are only required for a one acre plot.

PGPR Capsule

This capsule helps the crop to be more disease resistant and boosts the growth of the plants. The capsule costs @ Rs. 100 and five capsules are required for one acre plot.

Pseudomonas Capsule

Pseudomonas capsule helps in strengthening the roots, boosts disease resistance and protects the crop from fungal attacks. Single capsule cots Rs. 360 and three capsules are enough for an acre plot. The cost of production can be brought down considerably and the income can be increased manifold through the application of these capsules.

Method of usage

Keep the capsule in one liter warm water for 24 hours. Add 200 liter water to this solution. This can be applied in the basins or in grow bags

M/s. R L Co Innovative Agri Private Limited is also marketing micro nutrient mixture for ginger and pepper and also banana agri blossom.All these products makes the crop disease resistant and increase the productivity while decreasing the cost of cultivation. ■

CDB extends assistance for Quality Certification

The rapid growth in global coconut trade and the increasing demand for coconut products makes it all the more crucial to establish a quality system of production. The importance of standards in trade is fast becoming critical for the domestic as well as international trade. Adherence to specific standards increases the market value of the product. Hence CDB has introduced a scheme to assist coconut processors and entrepreneurs in complying with quality certification. Quality of coconut products and packaging assumes a distinct role in promoting market development of the product. The selection decision of the buyers and consumers is very much influenced by the quality certifications possessed by the product. There are many types of quality certifications in place for the processing of quality products which include systems on quality, environment management, occupational health and safety management, food safety management, energy management etc.

CDB is including financial assistance for Quality Certifications for entrepreneurs and processor. The scheme aims at encouraging entrepreneurs and processors to undertake quality certification of the process/product to facilitate better market development. These include ISO 9001 (Quality Management System), ISO 14001 (Environmental Management System), OHSAS (Operational Health safety), ISO 22000 and FSSC 22000 (Food safety), HACCP (Hazard Analysis at Critical Control Points), ISO 27001 (Information Security Management), ISO 28000 (Supply Chain Management) etc and other certifications like Fair Trade, Good Manufacturing Practices, Good Hygienic Practices etc. Government of India is also actively promoting quality certification and Quality Council of India had launched two new schemes for Indian food chain related industry namely IndiaGHP and IndiaHACCP certification schemes based on globally accepted Codex standards. These schemes will also help India food chain related industry to demonstrate compliance to global standards without having to go for costly and time consuming foreign certifications as many countries have mandated HACCP for high risk sectors and most developed countries have mandated Good Hygienic Practices (GHP) across all food sectors. FSSAI is also encouraging the food industry to aim for India HACCP standard though it mandated hygienic and sanitary practices through its licensing regulations. Proposed scheme: The scheme is proposed to promote quality certification and implementation of food safety management systems in harmonization with international standards.

Interested entrepreneurs or manufacturer exporters can submit proposal for quality certification. The proposal should include detailed component wise fee structure for implementation of quality systems and in house quality control lab equipments. The certification should be undertaken through recognized agencies accredited by National Accreditation Board for Certification Bodies. The applications will be scrutinized by an in-house Screening Committee of CDB. Financial assistance proposed is reimbursement of 50% of the cost for certification and in-house quality control equipments subject to a maximum of Rs.5 lakhs. The eligible assistance shall be reimbursed in two phases – 50% on submission of claim and 50% on completion of first periodic surveillance. Assistance will also be given for expenses related to the certification process, implementation of the quality system, application fee, product testing fee to the relevant standards, inspection charges, advance licence fee, surveillance charges, installation of in-house quality control lab equipment etc. Applicants should submit certificate from Government empanelled agencies in respect of proof of expenditure incurred for acquiring the certification along with the claim. Assistance for Kosher, Halal or any other religious certification is not eligible. Civil work, AC, refrigerator, computer, glassware, chemicals, consumables etc are also not eligible for assistance. Each applicant will receive assistance for only one system.

Quality assurance is a crucial factor that has to be ensured for coconut products in order to develop and sustain the domestic and export market demand. With a surge in the coconut industry world-wide, it is high time that our processors /exporters are equipped to come up with high quality products using state of the Art Technology.

For more information contact the Marketing Section of CDB. ■

Krishi Kumbh 2019

Coconut Development Board, Regional Office, Patna participated in Krishi-Kumbh-2019 organised at Gandhi Maidan from 9th to 11th February 2019 by the ICAR-Research Complex for Eastern Region, Patna.

Krishi-Kumbh 2019 was inaugurated by His Excellency, Governor of Bihar Shri Lalji Tandon, on 9th February 2019. Shri Radha Mohan Singh, Honourable Union Minister for Agriculture and Farmers' Welfare, Shri Ravi Shankar Prasad, Honourable Union Minister for Law, Information & Broadcasting, Shri Sushil Kumar Modi, Honourable Deputy Chief Minister, Bihar, Shri Pramod Kumar, Honourable Minister for Tourism, Bihar, Shri Shyam Babu Prasad Yadav, Honourable MLA, Pipra Kothi, Shri Sachindra Singh, Honourable MLA, Kalyanpur, Shri Sanjeev Kumar Singh, Member, CDB and other guests and farmers from Bihar and other states were present during the occasion. Honourable Union Minister for Agriculture and Farmers' Welfare in his address briefed on the different schemes implemented by the Ministry of Agriculture & Farmers' Welfare, Govt. of India and also about the developmental activities carried out by the Government of India.

Alongwith different organisations under Indian Council for Agriculture Research, various departments of Ministry of Agriculture and Farmers' Welfare, Govt. of India displayed their products and services in the Krishi Kumbh-2019. Agricultural machinery manufacturing units also exhibited their products like tractors, fertilizer-cum-seed drills, harrows, cultivators, harvesters etc.

Coconut Development Board took part in the programme and exhibited various coconut products and by-products & artifacts made of coconut wood in the stall. Coconut seedlings were also distributed at subsidized rate to the farmers.

Shri Pramod Kumar, Honourable Tourism Minister, Govt. of Bihar addressed during the valedictory session of Krishi Kumbh 2019. More than 10,000 farmers, entrepreneurs, scientists and self help groups participated in the fair.

Shri. Saradindu Das, Chief Coconut Development Officer, CDB hoisting the National Flag on Republic day at CDB Head Quarter premises at Kochi

The 135th Meeting of Coconut Development Board

The 135th Meeting of Coconut Development Board was held on 30th January 2019 at Chennai under the Chairmanship of Dr. Raju Narayana Swamy IAS, Chairman, Coconut Development Board. Members of the Board, Shri. K K Ragesh MP, Shri. Gangandeep Singh Bedi IAS, Secretary, Agriculture and APC Tamilnadu, Shri P.C. Mohanan Master, Shri P.R. Muraleedharan, Shri S. Mohan Raj, Dr. Biswanath Rath, Shri Sanjeev Kumar Singh, Shri. M R Sankaranarayana Reddy, Smt. Daksha Raamy and Shri R. Madhu, Secretary, Coconut Development Board attended the meeting.

State Level Seminar on Coconut, Goa

Coconut Development Board organized a state level seminar on Coconut on Aspects & Prospects of Coconut Production & Post Harvest Technology and Value addition at Ravindra Bhavan, Margao, Goa on 19th February, 2019 in association with Directorate of Agriculture, Government of Goa.

Shri. Vijai Suardesai, Hon'ble Minister for Agriculture, Government of Goa inaugurated the programme and Dr. Raju Narayana Swamy, IAS, Chairman, Coconut Development Board, Kochi presided over the function. Shri. Narendra Sawaikar, Hon'ble Member of Parliament, South Goa was the guest of honor. Shri. Angelo Fernandes, District Collector, and Chairman, ATMA South Goa was also present on the occasion.

A technical session was held after the inaugural session wherein Dr. J R Faleiro, Ex- principal scientist, ICAR- CCARI spoke on pest management in coconut and Mr. Vishram Gaonkar, Ex. Sr. Scientist, ICAR-CCARI spoke on Cultivation Practices in Coconut. A session on intercropping in Coconut was dealt by Dr. R. G. Khandekar, Professor Dr. Balasaheb Sawant Konkan Krishi Visdyapeeth, Dapoli. Mr. Nelson Figueiredo, Ex. Director of Agriculture, Govt. of Goa spoke on Diseases Management & Biologocal control measures and Mr. Dinesh Preyag, Manager Entrepreneur, Krishna Plantation spoke on Value addition. Shri.

Madhav Kelkar, Director of Agriculture, Govt. of Goa delivered the welcome address and Shri.Dattaprasad Desai, Project Director, ATMA South proposed vote of thanks. Coconut farmers, value added coconut products manufacturers, prospective entrepreneurs and officials and more than 300 delegates took part in the seminar.

CDB to collaborate with IIFPT, Thanjavur

Coconut Development Board in association with Indian Institute of Food Processing Technology (IIFPT) Thanjavur organized a National Seminar on Coconut Value Addition and Marketing on 15th February 2019 at IIFPT premises, Thanjavur. Dr. Raju Narayana Swamy, IAS, Chairman, Coconut Development Board was the Chief Guest of the inaugural ceremony of the Seminar. In his address, Chairman, CDB opined that in agriculture, value addition is the key means of income generation. He requested pioneer institutions like IIFPT to bring the technology to the doorstep of the farmers and entrepreneurs. The ultimate objective of CDB is to achieve the target of doubling farmers income by the year 2022. He hoped that this seminar would be a great step towards addressing many problems of the rural India like unemployment and poverty. Dr. C Anandharamakrishnan, Director IIFPT delivered the welcome address and the opening remarks. A technical session followed the inaugural session wherein subject experts spoke on various topics like value addition, marketing, banking, finance etc.

IIFPT develops biodegradable plates from coconut trees fallen in cyclone Gaja

The Indian Institute of Food Processing Technology (IIFPT), Thanjavur has come up with on Idea to overcome the issue of disposing of coconut trees fallen in cyclone Gaja. It has developed biodegradable plates from coconut tree powder. This would help farmers dispose of the fallen trees in a profitable way.

IIFPT has the technology to convert the coconut wood powder into valuable plates. This plate has a moisture barrier layer. "The institute has developed an easily biodegradable packaging plate from coconut wood powder. IIFPT is continuing this research further to make this plate in bigger size and make use of it in different food distribution areas. Each plate will cost Rs. 3". IIFPT director C Anandharamkrishnan said.

Source: https://timesofindia.indiatimes.com

CDB organized State Level workshop in Assam

Coconut Development Board in association with the Directorate of Horticulture & Food Processing, Govt. of Assam organized a State Level workshop on 'Aspects and prospects of coconut production and post harvest technology and value addition in coconut' on 2nd February 2019 at Panjabari, Guwahati.

Dr. P.K. Mahanta, Director of Horticulture and Food Processing, Govt. of Assam inaugurated the programme. Dr. Sarat Saikia, Chief Scientist, Horticultural Research Station, Assam Agricultural University, Kahikuchi; Dr. R. Bordaloi, Principal Scientist, ICAR-ATARI, Zone-VI, Guwahati; Dr. Alpana Das, Scientist in Charge, ICAR- CPCRI, Research Centre, Kahikuchi; Shri Lunghar Obed, Director, Coconut Development Board and other dignitaries and farmers were present during the occasion.

In his welcome speech, Shri Lunghar Obed informed the status of coconut cultivation in the northeastern states and Board's activities for the development of coconut in the region. He urged the farmers to give coconut, the status of a crop and to adopt scientific package of practices for better prospects in farming activities.

Dr. Sarat Saikia briefed the need for forming farmers' collectives and on the advantages of formation of FPOs in coconut sector. The management of coconut palms in Assam conditions for irrigation and application of manures & fertilizers was appraised to the farmers and he advised the farmers to take better care of the palms which are grown as homestead plants.

Dr. R. Bordaloi compared the coconut situation in Philippines, Indonesia and their advancements in coconut processing. He requested the farmers to cultivate coconut palms scientifically on large scale with a vision to venture into the production of various value added coconut products.

Dr. P.K. Mahanta, Director of Horticulture and Food Processing, Govt. of Assam appealed the participant farmers to go in for block plantations of coconut palms, as it can accommodate more perennial and seasonal crops as inter/ mixed crop in the interspaces. Mixed farming opportunities with livestock, poultry, fishery, etc. are also economically successful and if the land, water and human resources are utilized judiciously.

Dr. Alpana Das ,Scientist in Charge, CPCRI, briefed farmers about promising varieties, mixed and inter cropping and advised the farmers to avail the benefits of various schemes of the Board. Shri R. Jnanadevan, Deputy Director, CDB proposed vote of thanks.

In the technical Session, Dr. P. Mahanta, Principal Scientist, HRS, AAU, Kahikuchi spoke on 'Prospects of coconut cultivation in Assam & scientific cultivation of coconut' and Shri E. Aravazhi, Deputy Director, CDB spoke on 'Prospects of value addition in coconut & support of CDB'. Shri Kumaravel S, Development Officer, CDB briefed on Schemes of CDB for promotion of coconut cultivation & marketing'; and Smt. Tara Sarma, Director, Abad Agro Producers Co. Ltd spoke on 'Advantages & prospects of FPOs in coconut sector in Assam'. The farmers' queries on coconut cultivation, schemes, etc. were replied by the experts.

About 220 farmers from various parts of the state, officers from other State and Central Government establishments attended the workshop. An exhibition of various value added products of coconut was also arranged as part of the workshop for the benefit of the farmers.

CDB- Vanitha Coconut Cookery Contest

Healthy coconut dishes tickled the taste buds in the contest

More and more people are realizing the need to include in their daily diet which has better health benefits.

In order to create more awareness about the various health benefits of coconut and its products and also as part of the product promotional campaign, Coconut Development Board in association with Malayala Manorama and Malabar Cultural Centre conducted coconut cookery contest at Jawaharlal Nehru Stadium Kochi on 2nd February 2019. Smt.Kaamila Kasim and Smt. Rasbin Raisi bagged the first prize in Snacks and dessert category for coconut chicken pocket and tender coconut pudding respectively. Riswana Shiraz and Sajeera Sameer were the first runner-ups, who prepared chatty pathiri and cococnut milk pudding and Jameela Moosa and Shabeena Sakkaria bagged the third position for Kalmaas and tender coconut pudding respectively.Dr. Raju Narayana Swamy IAS, Chairman, CDB distributed the prizes to the winners .

26 participants took part in the contest with 52 items. Shri. Sreekumar Poduval, Processing Engineer, Smt. Annie Eapen, Senior Chemist and Smt. Aneeta Joy, Food Technologist, CDB Institute of Technology were the judges of the contest. The programme was conducted as part of sponsorship of Vanitha Utsav - Malabar Food Fest 2019 by CDB held at Kochi from 25th January to 13th February 2019. Coconut Development Board also took part in the fest by displaying various coconut value added products like fresh neera, neera biscuit and chocolate, tender coconut water, coconut milk, coconut paste coconut oil, virgin coconut oil, coconut shell based products etc. M/s. Deepak Handicrafts, M/s. Keratech, M/s. Malampuzha Coconut Producer Federation, M/s. Onattukara Coconut Producer Company, M/s. Teejay Products, M/s. Taaza Coco, M/s. Jupiter Handicrafts, M/s. Double Horse, M/s. Pranathma Ayurvedic Coconut Products, M/s. Jupiter Woodcrafts and M/s. Viswakarama Woodcrafts had their display cum sales counters in the Board's stall.

Inauguration of Malabar Food Fest by Dr. Raju Narayana Swamy IAS

Market launching of coconut chunks and coconut haustorium candy produced by CDB Institute of Technology by Dr. Raju Narayana Swamy IAS.

Prize distribution
Category - Coconut Snack

Prize distribution
Category - Coconut Dessert

Review meeting of CPCs held

A review meeting of the Coconut Producer Companies formed under the initiative of CDB in Andhra Pradesh was conducted on 29th January 2019. Shri. C P Sivarama Krishna, Chairman, Chaithanya CPC, Gondi delivered the welcome address and the Chairmen of various CPCs briefed on the activities and future plans of the company. Shri. R Jayanath, Deputy Director i/c, CDB spoke on the importance of establishing processing units by CPCs. Shri. C H Srinivasulu, Assistant Director, Horticulture, Department of Horticulture, Amalapuram briefed on the importance of coconut cultivation, intercropping and implementation of replanting and rejuvenation programme in East Godavari district and value addition for improving the returns from coconut. Shri. Venkateswar Rao, Additional Director (retd) Special Officer, APLIP-II and Shri. Vikas, M/s.Vepuri Agro Products spoke during the occasion. Directors of various CPCs attended the meeting.

Cultivation practices for coconut -March

Collection and storage of seed nuts

Continue seed nut collection from the identified mother palms. Seed nuts should be carefully harvested and properly stored to prevent drying of nut water. Wherever the ground surface is hard, harvested bunch should be lowered to the ground using a rope.

Nursery management

Continue irrigation for the seedlings in the nursery. Weeding has to be done wherever necessary. If termite infestation is noted in the nursery drenching with chlorpyriphos (2ml chlorpyriphos in one litre of water) should be done. Spiralling white fly infestation is observed in coconut nurseries in many localities. Spraying of water on the lower surface of leaves of seedlings can be done against spiralling white fly attack.

Fertilizer application

In irrigated coconut gardens, apply one fourth of the recommended dose of chemical fertilizers to the coconut palms.

Irrigation

Irrigation has to be continued in coconut gardens. If basin irrigation method is adopted, provide irrigation once in four days @ 200 litres per palm. Drip irrigation is the ideal method of irrigation for coconut. The number of dripping points should be six for sandy soils and four for other soil types.

Moisture conservation

Deficit of rainfall received during the monsoon seasons has resulted in quick depletion of available soil moisture and towards the peak summer days scarcity of water for irrigation will be a major problem in most of the coconut growing areas. Hence, it is imperative that coconut growers judiciously use water for irrigation. Drip irrigation has to be adopted to save water. Mulching and other soil and moisture conservation practices should be adopted if not done earlier. In water scarce areas, wherever feasible, life saving/protective irrigation has to be provided to coconut palms. Mulched materials are to be removed in the basin before giving such life saving/protective irrigation and immediately after providing irrigation the basin should be covered again with the mulching materials.

Shading

Shade has to be provided for the newly planted seedlings, if not already provided.

Management of pests and diseases

The month of March remains dry throughout, however, some summer showers at random could reduce the heat intensity and accelerate some humidity favouring outbreak of pests. The sucking pests such as whiteflies as well as coconut eriophyid mite could increase during the period. The slug caterpillar endemic regions should be strictly

Adults weevils

Crown entry

Toppling of palm

monitored and precautions should be carried out to prevent expansive spread by destroying pest-laden older leaves. Rugose spiralling whiteflies will find weather conditions very conducive and therefore suitable health management approaches such as nutrition and watering is very critical to upkeep proper health so as to put forward extra foliage to counter pest attack. Coconut seedlings in nurseries should be strictly monitored for rugose spiralling whitefly and nesting whiteflies. The odour plumes of deteriorating palm residues in the cyclone affected areas of Andhra Pradesh and Tamil Nadu could orient the red palm weevil for egg laying in the standalone palms for which strict monitoring is warranted. Crop residue burning on the palm basin should be avoided or it may soften trunk issues paving entry of stem bleeding and basal stem rot pathogens. March is thus known for strict monitoring days for maintaining good palm health and evading pest attack.

Red palm weevil *(Rhynchophorus ferrugineus)*

Incidences of rhinoceros beetle, would subsequently induce the invasive potential of the killer native pest, viz., the red palm weevil, which needs an injury for the weevils to orient towards the palm cue and lay eggs. Yellowing of leaves in mid whorl region, oozing of brown fluid, presence of bore holes, choking of spindle region and gnawing sound of grubs heard along the trunk are some early symptoms for timely diagnosis of pest damage. Farmers fail to detect the pest damage at an early stage due to concealed habitat of the pest. Dwarf genotypes and palms aged between 5-15 years are relatively more susceptible. All life stages of the pest were noticed inside the infested palms. Being a fatal enemy of palms, 1% action threshold has been fixed.

Management

- Avoiding palm injury is very critical to disorient the gravid weevils away from the field and therefore leave out at least one metre from palm trunk when petioles are cut.
- Complete destruction of pest affected palms / crown toppled palms immediately
- Crop geometry and correct spacing is very crucial to reduce pest attack.
- Timely and targeted spot application of imidacloprid 0.002% (1 ml per litre of water) or indoxocarb 0.04% (2.5 ml per litre of water) on infested palms would kill the feeding grubs and induces recovery of palms by putting forth new spear leaf.
- Crop-habitat diversification (Ecological Bio-engineering) through coconut based cropping system strategy inciting defenders and pollinators would diffuse the palm-linked volatile cues and encouraged pest suppression. Diversified cropping system reduced pest incidence than mono-cropping.

Cocout eriophyid mite (*Aceria guerreronis*)

Coconut eriophyid mite is the invasive pest reported from our country during 1998 and has

Mite damaged nuts

Mite colony

Progression of mite damage

been on the rise during post-winter season. It belongs to the spider family with two pairs of legs, sub-microscopic (200-250 microns size), lays about 100-150 eggs and the life cycle completed in 7-10 days. Mites infests the developng nuts immediately after pollination and are confined within the floral bracts (tepals) and feeds on the meristematic tissues beneath the perianth. Appearance of elongated white streak below the perianth is the first visible symptom. Within few days, yellow halo appears round the perianth, which turns as warts and finally develops as cracks, cuts and gummosis. Shedding of buttons, immature nuts, malformation of nuts are other indications of mite damage.

Management

a) Removal and destruction of dried spathes, inflorescence parts and fallen nuts to subdue the pest population

b) Spraying 2% neem-garlic emulsion or azadirachtin 10000 ppm @0.004% or root feeding with neem formulation containing azadirachtin 10000 ppm at 10 ml with equal volume of water three times three times during March-April, October-November and December –January is recommended.

c) Application of talc-based preparation of acaropathogen, *Hirsutella thompsonii*@ 20 g / litre/ palm containing 1.6 x 108cfu three times in synergy with neem formulation.

d) Kalpaharitha (a selection from Kulasekharam Tall) was found field tolerant to mite damage.

e) Application of recommended dose of fertilizers, recycling of biomass, raising of green manure crops in palm basin and incorporation during flowering, summer irrigation including soil and water conservation measures improve the palm health and reduce the pest attack.

Slug caterpillars *(Darna nararia)*

Emergence of slug caterpillar, *Darna nararia* is East Godavari district, Andhra Pradesh and Tumkur, Karnataka could happen as this period is quite conducive for the population build up especially on coconut palms planted along the river beds and brackish water zones. Several hundreds of caterpillars would congregate and feed from under surface of palm leaflets, causing glistening spots and in synergy with grey leaf blight disease complete scorching of leaflets could be observed. In severe cases, complete defoliation was realized and only midribs will be spared. High temperature and cool weather could be one of the triggering factors.

Slug caterpillar infested field

Mature caterpillars on palm leaflet

Management

- Complete destruction of affected palm leaflets with caterpillar at early stages of infestation should be made immediately so that the pest build up is suppressed. Care should be taken as the caterpillars cause extreme itching when contacted with human skin due to the presence of poisonous scoli.
- Establishment of light traps and spraying Bacillus thuringiensis 5 g/litre was found effective along with inundative biological control using the eulophid larval parasitoid, Pediobius imbrues.

Stem bleeding *(Thielaviopsis (Ceratocystis) paradoxa)*

This disease is mostly confined in the acid soils of Kerala and becomes quite explicit during the period. Conspicuous exudation of reddish-brown gummy fluid is visible on the trunk which turns black on drying. It could be observed initially as small bleeding patch along the longitudinal crack, which

Lesions on the trunk of stem-bleeding affected palms

later coalesce and form extensive lesion. The tissues underneath show tremendous discoloration and decay subsequently. In advanced stage of infection, outer whorls of leaves turns yellow, dry and shed prematurely affecting the overall health of the palm. Invasion by scolytid beetles such as *Diocalandra* and *Xyleborus* would further weaken the stem.

Management

- Avoid burning of trash and palm residues near the trunk to avoid trunk/root injury
- Adequate irrigation and adoption of soil and water conservation measures is advised.
- Application of 5 kg of neem cake enriched with Trichoderma harzianum and soil test based nutrition.
- Application of paste of Trichoderma harzianum talc formulation on the bleeding patches on the trunk was also found effective in preventing the spread of stem bleeding.

Basal stem rot disease *(Ganoderma spp.)*

It is a destructive disease observed in all coconut growing regions and found very severe in soils with higher pH and moisture stress condition. The pathogen invades the root system during early stages of infection that are not visibly noticed. Very severe in areas of Thanjavur, Tamil Nadu parts of East Godavari, Andhra Pradesh and Arsikara, Karanataka. The outer whorl of leaves turn yellowish, then gradually become brown and droop from their point of attachment and hang vertically downwards to form a skirt around the trunk apex. In course of time, the apex of the trunk shows tapering with the advancement of the disease, and bleeding symptoms may appear on the bole region. At the base of the stem a characteristic reddish brown discoloration develops, accompanied by the exudation of a brown viscous gummy substance. These brownish patches may extend up to one metre from ground level and at times bark pealing was also observed. Sometimes fruiting bodies (*basidiocarp*) of the pathogen develop from the affected trunk.

Management

- Avoid burning of trash and palm residues near the trunk to avoid trunk/root injury
- Removal of dead palms and palms in advanced stage of the disease as well as destruction of the boles and root bits of the diseased palms to remove disease inoculums.
- Isolation of neighboring healthy palms, by digging isolation trenches (60 cm deep and 30 cm wide) around the affected palm (1.2 m away from the base of the trunk).
- Application of neem cake (5 kg) fortified with Trichoderma harzianum (CPTD 28) talc formulation

Basal stem rot disease

(50 g) per palm per year at six monthly intervals reduced the disease intensity.

- Root feeding of hexaconazole @ 2% (100 ml solution per palm) and soil drenching with 0.2 % hexaconazole or with 40 l of 1% Bordeaux mixture in the coconut basin are recommended

Sustained monitoring and prophylactic treatments would suppress the damage potential of pest and disease and suitable health management strategies need to be adopted at the appropriate time. Timely pest management strategies had to be implemented in March to upkeep sound palm health for ensuring sustained production and keep away from pest and disease infections. ■

(Prepared by: Thamban, C. and Subramanian, P., ICAR-CPCRI Kasaragod; Joseph Rajkumar ICAR-CPCRI Regional Station, Kayangulam)

Market review – January 2019

Domestic price

Coconut Oil

During January 2019 the price of coconut oil opened at Rs.18200 per quintal at Kochi, Rs. 18100 per quintal at Alappuzha market and Rs.18400 per quintal at Kozhikode market. During the month, price of coconut oil at all three markets expressed a mixed trend.

The price of coconut oil closed at Rs.17900 per quintal at Kochi and Rs.18000 per quintal at Alappuzha market and Rs.18400 per quintal at Kozhikode market with a net loss of Rs.300 per quintal at Kochi and Rs.100 per quintal at Alappuzha market.

The price of coconut oil at Kangayam market in Tamilnadu, which opened at Rs.16667 per quintal, expressed an downward trend and closed at Rs.15333 per quintal with a net loss of Rs.1334 per quintal.

Weekly price of coconut oil at major markets Rs/Quintal)				
	Kochi	Alappuzha	Kozhikode	Kangayam
01/01/2019	18200	18100	18400	16667
06/01/2019	18200	18200	18500	16667
13/01/2019	18600	18600	18850	16667
20/01/2019	18600	18600	19000	16667
27/01/2019	18200	18300	18450	16333
31/01/2019	17900	18000	18400	15333

Milling copra

During the month, the price of milling copra opened at Rs.12100 per quintal at Kochi, Rs.11700 per quintal at Alappuzha market and Rs.12200 per quintal at Kozhikode market. The price of milling copra at all three markets expressed a mixed trend during the month.

The prices closed at Rs.11800 at Kochi market, Rs.11700 at Alappuzha and Kozhikode markets with a net loss of Rs.300 per quintal at Kochi, Rs.500 per quintal at Kozhikode market.

At Kangayam market in Tamilnadu, the prices opened at Rs. 11800 per quintal and closed at Rs.10900 per quintal with a net loss of Rs.900 per quintal.

Weekly price of Milling Copra at major markets (Rs/Quintal)				
	Kochi	Alappuzha (Rasi Copra)	Kozhikode	Kan-gayam
01/01/2019	12100	11700	12200	11800
06/01/2019	12100	11850	12000	11400
13/01/2019	12500	12200	12100	11500
20/01/2019	12500	12200	12300	11600
27/01/2019	12100	11800	11800	11000
31/01/2019	11800	11700	11700	10900

Edible copra

The price of Rajapur copra at Kozhikode market which opened at Rs. 18700 per quintal expressed an overall downward trend during the month and closed at Rs.15200 per quintal with a net loss of Rs.3500 per quintal.

Weekly price of edible copra at Kozhikode market (Rs/Quintal)	
01/01/2019	18700
06/01/2019	18100
13/01/2019	17000
20/01/2019	16100
27/01/2019	15300
31/01/2019	15200

Ball copra

The price of ball copra at Tiptur market which opened at Rs.16500 per quintal expressed an overall mixed trend during the month and closed at Rs.16400 per quintal with a net loss of Rs.100 per quintal.

Weekly price of Ball copra at major markets in Karnataka (Rs/Quintal)	
01/01/2019	16500
06/01/2019	16800
13/01/2019	16700
20/01/2019	16751
27/01/2019	16500
31/01/2019	16300

Dry coconut

At Kozhikode market, the price of dry coconut opened at Rs.9350 per quintal expressed a downward trend during the month and closed at Rs.8100 per quintal with a net loss of Rs.1250 per quintal.

Weekly price of Dry Coconut at Kozhikode market (Rs/Quintal)	
01/01/2019	9350
06/01/2019	9350
13/01/2019	9250
20/01/2019	8500
27/01/2019	8100
31/01/2019	8100

Coconut

At Nedumangad market the price of partially dehusked coconut opened at Rs.16000 per thousand nuts and closed at Rs.18000 per thousand nuts with a net gain of Rs.2000 per thousand nuts. At Pollachi market in Tamil Nadu, the price of coconut opened at Rs.16000 per thousand nuts and closed at Rs.15000 per thousand nuts. At Bangalore APMC, the price of partially dehusked coconut opened at Rs. 17500 and closed at Rs.13500 per thousand nuts.

Weekly price of coconut at major markets (Rs /1000 coconuts)			
	Nedumangad	Pollachi	Banglore
01/01/2019	16000	16000	17500
06/01/2019	16000	16000	17500
13/01/2019	18000	16000	17500
20/01/2019	18000	16000	17500
27/01/2019	18000	16000	17500
31/01/2019	18000	15000	13500

International price

Coconut oil

The international price of coconut oil and domestic price of coconut oil in Philippines, Indonesia, Srilanka and India expressed an overall downward trend during the month. The price of coconut oil quoted at different international/ domestic markets is given below.

Weekly price of coconut oil in major coconut oil producing countries				
	International Price(US$/MT)	Domestic Price(US$/MT)		
	Philippines/ Indonesia (CIF Europe)	Philippines	Indonesia	India*
5/1/2019	801	785	781	2360
12/1/2019	791	770	772	2360
19/01/2019	799	750	754	2360
26/01/2019	768	740	737	2313
				* Kangayam

Copra

The domestic price of copra at Philippines, Indonesia, Srilanka and India expressed an overall downward trend during the month. The price of copra quoted at different domestic markets is given below.

Weekly International price of copra in major copra producing countries				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India*
5/1/2019	494	407	913	1614
12/1/2019	495	419	913	1628
19/01/2019	477	422	913	1642
26/01/2019	447	454	919	1557
				* Kangayam

Coconut

The price of coconut quoted at different domestic markets in Philippines, Indonesia, Srilanka and India are given below.

Weekly price of dehusked coconut with water				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India*
5/1/2019	126	140	160	467
12/1/2019	124	142	165	467
19/01/2019	126	141	165	481
26/01/2019	125	142	166	481
				*Pollachi market