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Smt. V. Usha Rani IAS assumes Charge as Chairman, Coconut Development Board

Smt. V. Usha Rani, 1995 batch IAS officer from Andhra Pradesh cadre and the Director General, National Institute of Agricultural Extension Management, Hyderabad assumed the charge of Chairman, Coconut Development Board. She was the Commissioner and Secretary, Horticulture, Government of Andhra Pradesh.

Smt. V. Usha Rani has served as the Commissioner, School Education; State Project Director, Sarva Shiksha Abhiyan; Commissioner, Agriculture and Commissioner, Women & Child Welfare. She was the District Collector and District Magistrate of Mahboobnagar and Khammam districts of present Telangana state.

Dr. Raju Narayana Swamy IAS relinquished charge of Chairman, Coconut Development Board

Dr. Raju Narayana Swamy relinquished charge of Chairman, Coconut Development Board. He is repatriated to his parent cadre of Government of Kerala.

Message from the Chairperson's Desk

Dear readers,

Coconut is a gift to mankind as it gives many products which are required for human beings like food, drink, beverage, oil, fiber etc. Every part of the coconut tree can be put to commercial use as there is unlimited possibilities to value addition. Coconut Development Board has been serving farmers since inception. After taking over as Chairman of Coconut Development Board, I started really looking the coconut plant as an income provider to the farmers and as a health provider to the human being. Coconut Development Board wants to concentrate on the research activities which are going to have long term impact for commercial exploitation of this plant through improved productivity. We are investing on the new researches to develop new technologies by which farmer will get maximum benefit by choosing the coconut crop for cultivation.

Presently, though India records high productivity in coconut, export earnings from the coconut are not encouraging while small countries are leading in exports. Farmers also always complain about the lack of remunerative prices while there is ample demand for products nationally and internationally. This is mainly because of the lack of investment in the coconut industry, lack of competitive technologies to reach international standards and also lack of awareness among farmers to fully utilize the opportunities. Coconut Development Board wants to focus on all the above three aspects to benefit farmers. Our vision is to encourage rural entrepreneurs to produce quality materials and made available to the farmers, encouraging new technologies for value addition and connecting farmers to the industry through Farmer Producer Organisations, Societies etc. From now on, more emphasis will be laid on the coconut processing industry. The strategies of Coconut Development Board will be developing good linkages with researchers, entrepreneurs and farmers through our highly motivated employees who dedicate themselves to the organisation. Let us wish coconut farmers great days ahead.

V Usha Rani IAS

Chairperson

Strengthening coconut sector in Lakshadweep Islands

Status and strategies for value addition and marketing

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Background

Though tremendous opportunities exist in the Lakshadweep islands for enhancing income from coconut farming through production and marketing of value added products, there are only very few coconut based processing units functioning in the islands. The opportunity to market value added coconut products from the islands as 'Lakshadweep organic brand' is also yet to be properly utilised. Inadequacy of entrepreneurship among the islanders for exploring the potential for income generation through coconut based value addition enterprises is quite evident. Few entrepreneurs who have ventured to market organic coconut oil are encountered with many problems especially those related to marketing. Copra, coconut oil, coir and coir products, neera (coconut inflorescence sap) and coconut jaggery are the major traditional coconut based enterprises available in the islands. Enterprises for value addition using advanced processing machineries and infrastructure are yet to be established. Problems due to limited transportation and marketing facilities, lack of difficulty in repair and maintenance of the existing old machinery in the coconut processing units functioning under government agencies, lack of efforts for facilitating farmer collectives to take up value addition enterprises, lack of proper guidance for individual private entrepreneurs in the islands

for the production and marketing of coconut value added products, lack of labour and high wage rate etc. adversely affect the sector.

A team of scientists from ICAR-CPCRI recently visited different islands as part of the expert team constituted by National Horticulture Board for survey and selection of young farmers/entrepreneurs from Lakshadweep islands for Horticulture Entrepreneurship Development Programme. The team interacted with officials of Departments of Agriculture, Industries and Co-operation, people's representatives, entrepreneurs and farmers and visited coconut based processing units in different islands to assess the scenario of value addition and marketing of coconut. Based on the stakeholder interaction and visit to the processing units the team made suggestions on strategies for strengthening the coconut sector in the islands through value addition.

▶ *i. Coconut consumption pattern*

A substantial quantity, roughly one-fourth, of nuts produced in the islands are used for domestic consumption. Coconut is the key ingredient in all the culinary preparations of the islands. There are a number of recipes using fresh matured kernel, half matured kernel and tender kernel. Major share, nearly two-third, of coconuts produced are used for copra preparation. Tendernut consumption is very limited; about less than five per cent of total production of nuts. Islanders use tendernut mostly during 'Eid', the festival season. Tendernuts are also harvested for the tourists visiting the islands. Limited quantity, less than five per cent, of nuts are used for making coconut oil for domestic consumption. A small quantity of nuts are sold by farmers to desiccated coconut factories in Kadmat, Amini, Androth, Kalpeni and Agatti islands under Laccadive Development Corporation Limited (LDCL). The consumption pattern of coconuts in Lakshadweep islands clearly indicate the unutilised potential for value addition through product diversification for higher income.

▶ *ii. Marketing of coconut*

In the olden days marketable surplus of nuts were converted to copra and sold. But of late the trend is changing. Many farmers do not show any interest in copra preparation, instead they directly sell fresh mature nuts to the local traders. This trend is prevalent more in islands like Androtт, Minicoy and Kavaratti which have more transport facilities for shipping nuts to the markets in the mainland, mainly in Kozhikode. In Androtт island it is observed that about 90% of the produce is sold as nuts and only 10% of nuts are made into copra. Lack of interest among the new generation for the traditional activities like copra making, shortage of skilled labour and high wage rate are some of the reasons attributed for the shift towards selling as nuts.

▶ *iii. Production and marketing of copra*

Traditional method of copra making and marketing is the major economic activity in the farm sector in the islands. Copra is made by sun drying in the traditional way. Every thing related to copra making is done manually. Modern copra dryers are used by only few entrepreneurs in islands like Androtт who are in to production and marketing of coconut oil. The season for copra making is from December to May. By December-January farmers and entrepreneurs prepare temporary drying yards in the open space near the sea shore. Each square shaped drying unit is demarcated using thatched coconut leaves. Dehusked nuts are transported to these drying yards, cut and spread for drying, deshelling done and packed in gunny bags after proper drying for sending to markets. Drying time usually taken is seven days. Farmers assess the proper drying of nuts by test breaking the dried copra cup and listening to the sound while breaking by hand. Due to the inadequacies of the traditional method of sun drying, farmers often find it difficult to produce copra meeting the minimum standards specified by the procuring agencies and thus realising less income. During rainy season after May farmers store the harvested nuts.

There are two predominant marketing channels for copra in the islands: i. Farmers sell copra to private local trader (who can be the agent of main land trader also) who in turn transport it to mainland and sell to big traders in the mainland. ii. Farmers sell copra to co-operative society in the island. The volume of copra transaction through these two channels differ from island to island. For example, in Kiltan island about 80% of copra is sold to the society by farmers and only the remaining is traded through the private traders. But in some islands societies do not procure copra to that extent mainly due to lack of fund allocation in time by Lakshadweep Cooperative marketing Federation.

There is a third marketing channel also in which big farmers or group of farmers who are close relatives or neighbours transport their copra to mainland and sell copra to private traders in the mainland. Only a small quantity of copra is traded through that

type of channel. Motor Sailing Vessels (MSV) locally called 'Manchu' transport copra every fortnight from the islands to the mainland markets. During earlier days group of 3-4 farmers used to transport copra in sailing boats (locally called as "uru") to the mainland markets located at Mangalore, Kozhikode and Kochi to directly sell to traders.

Using the money obtained by selling copra all household items required for the next season are purchased and brought to the islands.

Co-operative Supply and Marketing Society in the islands functioning under the Department of Co-operation procure copra from farmers during the season from January to May. The society will issue a slip to the farmer when the copra is procured and a part of the market price will be paid next day at the Kozhikode market rate published in the newspaper (Kozhikode edition) on the date of procurement in the island. The balance amount will be settled only after disposal of copra in the mainland market. While procuring copra the societies ensure good quality of the copra as per the specification; ensuring that copra procured conform to the standards for the maximum limits of tolerance for fungal infected copra (5% by count), wrinkled kernels rubbery copra (5% by count), smoky kernels (5% by count), moisture (5%)and insect infestation (nil). Island farmers often experience difficulties due to the delay in payment for the copra sold and insistence for the quality standards by the co-operative societies. Societies will send the copra to the apex body viz., The Lakshadweep Co-operative Marketing Federation at Beypore, Kozhikode. The federation in turn sell the copra from Kozhikode to NAFED or big private enterprises like MARICO or other big private traders in the mainland; usually within two days. Farmers in the islands will be paid the balance amount by the society in the next day after the copra is sold in the mainland market by the federation. Though societies most of the times offer higher market rate for copra compared to the private traders, delay in payment is a problem experienced by farmers and hence many of the farmers transact with private traders.

▶ *iv. Coconut oil*

Earlier days people of Lakshadweep prepared coconut oil for their domestic consumption through the indigenous copra milling method using 'chakku'. Currently a few modern small scale copra milling units are functioning in the islands in private sector to meet the demand for coconut oil. Few of them export the oil to mainland and one private entrepreneur from Andrott island has started exporting coconut oil to the Middle East countries.

The commercial enterprises in the private sector are trying to sell coconut oil as 'Lakshadweep organic' making use of the government programme to get organic certification for the farm holdings in

the islands. However, the coconut oil production units experience various constraints which include problems in marketing, lack of sufficient funds for procurement of nuts, lack of labour, high cost of transportation of oil to mainland and difficulty in transportation during the adverse climatic condition of monsoon period etc.

The entrepreneurs also perceived that more support is required from governmental agencies including the Department of Industries for successfully running the enterprises. They further opined that public sector agencies under the UT administration like LDCL, SPORTS (Society for Promotion of Nature Tourism and Sports) etc. can procure coconut oil from them for supply/use and sales through their outlets. Another difficulty experienced by the coconut oil enterprises in the islands is that there is no technical expertise available in the islands in the event of any damage or malfunctioning of equipments and machineries.

▶ *v. Virgin Coconut Oil (VCO)*

Home scale processing of Virgin Coconut Oil has been a traditional practice in the households of Lakshadweep islands. The traditional method of VCO preparation involves grating the kernel of mature coconuts, extraction of milk from the gratings, keeping the milk thus extracted for cooling overnight, boiling the milk next day for about two and half hours and separating the VCO.

Women folks of the islands are the skilled work force involved in VCO preparation and marketing. VCO thus produced is sold locally and is used as hair oil, baby oil, massage oil etc. Village Dweep panchayat supports VCO production through interventions under which coconuts are supplied to women and VCO produced by them is collected back and sold .

Though VCO is attracting attention worldwide as a value added coconut product having a number of medicinal and nutraceutical properties there are not many commercial VCO production units in the islands employing modern methods and machineries. We could meet Mr Mohmmed Iqbal, an entrepreneur in Andrott island who is manufacturing VCO through Direct Micro Expelling (DME) technology in his enterprise 'Dweep Fibres and Traders'. Mr. Iqbal is not aware much about the advanced and efficient

methods for production of VCO. His unit processes about 350 kg coconuts a day and produces about 35 kg VCO which is sold in the mainland, mainly in Kozhikode market. Major problem experienced by him in successfully managing the VCO production unit is related to transportation and marketing. The mature coconut water, the by product obtained during the processing is presently has no use and is disposed as such. The technology for vinegar, mature coconut based unfermented beverages such as squashes, Ready- To-Serve etc. can be included in his unit to get more income and to solve the problem of waste disposal.

Conventional hot processing of VCO is practiced in many units. The by-products such as mature coconut water, coconut milk residue, VCO cake are presently under utilized. Coconut water based value added products, coconut milk residue based snacks, bakery and confectionary products, VCO cake based confectionary products. There is potential for commercial production and marketing of VCO as a value added coconut product under the 'Lakshadweep organic brand' which is not presently utilised/ explored. Interventions are required for facilitating FPOs and women SHGs for tapping the potential for production and marketing VCO.

▶ *vi. Neera*

'Neera' (coconut inflorescence sap) tapping and utilization of the sap for consumption and preparation of spread/ sugar and vinegar is a traditional practice in all the Lakshadweep islands. The conventional method of neera (locally known as 'meera') tapping involves cutting the unopened spadix for about 15 cm from the tip of spathe. After a week, the entire spathe will be removed. The inflorescence sap oozing out is collected twice in a day in plastic can/ bottle kept close to the cut end of the spadix. Tapping is done for about 45 days.

Department of Agriculture has been implementing a major scheme for promoting neera tapping and jaggery preparation in the islands. As part of the scheme, Department of Agriculture lease in coconut palms from farmers for neera tapping and pay them lease amount @ Rs 1000/palm/year. Experienced and skilled casual labourers are engaged as neera tappers through the village Dweep Panchayat and the department pays them wages. During 2018-19, 25 neera tappers are engaged in tapping in Androtт island who tap coconut palms in 21 selected coconut

gardens of farmers. Neera thus collected is sold to the public in the form of neera, vinegar and jaggery. About 80% of vinegar and jaggery requirements of the Androth island is met under this scheme. In Androtт island a voluntary organisation of youth (Socio Economic Arts and Sports Empowerment Society, SEASES) is also involved in procuring neera from tappers and produce and market coconut jaggery among the islanders. The club purchase on an average 50 litres of neera from tappers @ Rs 70/- per litre, out of which they produce about 7 kg of coconut spread/jaggery which is sold @ Rs 550/- per kg. They also sell neera @80/- per litre. There is scope for improving the neera tapping method and methods of preparation of vinegar and jaggery. The

technology of neera collection and sugar production was demonstrated by CPCRI in the islands and 3-5 tappers were trained for collection of neera using "Coco-sap chiller".

▶ *vii. Desiccated Coconut Powder*

Desiccated Coconut Powder (DCP) is produced and marketed by LDCL through the coconut processing units located at Kadmat, Amini, Androth, Kalpeni and Agatti islands. A part (35-40%) of DCP produced are sold locally. There is good demand for DCP during the tourist season from October to March and buyers are attracted since the DCP made available is made from organically produced coconuts. The unit at Kadmat

also has an oil expelling unit for utilising the testa, the co-product of DCP. Presently LDCL, Kochi is the main outlet for marketing DCP. However, outlets available for marketing the product in other localities can also be explored, especially by highlighting the special feature of 'DC processed from organically grown coconuts from the islands'. There is a huge scope for improving the functioning of the coconut processing units under LDCL. The old buildings and infrastructure need to be renovated and advanced equipments and machineries can be introduced. More attention needs to be paid for maintaining quality standards for the value added coconut products and for introducing

improved packaging system such as Form Fill Seal (FFS) machines. In the DCP factory the process chain can be completely mechanized for producing export quality DC powder from Lakshadweep. In addition, a small quality control laboratory needs to be set up along with the existing plant.

▶ *viii. Coir and coir products*

Five coir fibre factories, five production demonstration centres and seven fibre curling units are functioning in Lakshadweep islands under the Department of Industries, U.T of Lakshadweep. These units produce coir fibre, coir yarn, and curled fibre and coir mats. In the coir fibre factory in Kadmat island about 1200 coconut husks are processed per day for coir fibre using the retting method. The yield of fibre obtained is about 70-75 kg. Coir pith, the by product, is unutilised. Women labourers (10 women workers) are engaged for coir spinning. The conveyer belt is not in working condition. The existing machineries can be replaced with improved alternatives. Setting up of facility with improved machineries will result in drudgery reduction and improving the output. Sales of the mat produced is confined only to the factory outlet. Collaboration with Institutes/ agencies like Coir Board should be made useful for marketing these coir based products. The Coir Production Centre in Andrott island engage 12 workers; 11 women and one male. There are eight spinning machines in the centre, two are damaged and need to be repaired. The centre experience difficulties such as lack of availability sufficient quantity of coir fibre, delay in getting spare parts of machineries. Once the machines are damaged there is huge delay in getting the same repaired. The efficiency of coir fibre and spinning units can be enhanced by improving infrastructure, introducing new machineries and equipments, timely repair of machineries, product diversification etc.

Coconut fibre based jewellery making and handicrafts: During 2009 five women from Andrott island were trained on Coconut fibre based jewellery making and handicrafts at National Coir Training & Design Centre (NCT&DC) functioning under the Central Coir Research Institute of Coir Board, Kalavoor, Alappuzha in Kerala state. On their return after training, these women started making coconut fibre based jewellery items and once they had sent the prepared items to NCT&DC. In 2016, these master trainers started imparting training to selected women from the island. Presently the unit is having 40 trainees in two shifts. The trained women make very attractive jewellery items using coir fibre. Minimum two days are required to finish a product. However, they find it difficult to market the items and there are no schemes by the concerned governmental agencies to support these trained women. Interventions are needed for facilitating the formation of a women SHG on coconut fibre based jewellery making and handicrafts in the islands along with support for arranging exhibition and sales of items, especially in islands which are visited by more number of tourists. Presently the coir jewellery

making unit is located adjacent to the fish market which, according to the women workers, is not at all a conducive working environment. There is scope for starting a coir fibre jewellery unit –cum- incubation centre as part of the coir factory for which financial assistance can be made available from Coir Board or CDB.

▶ *ix. Scope for production and marketing of value added coconut products*

Apart from the value added products discussed above, there is scope for initiating interventions to facilitate establishing enterprises for the production and marketing of other value added coconut products such as coconut ice cream, coconut chips, etc. FPOs and women SHGs can be formed and facilitated in selected islands for managing such enterprises.

▶ *x. Credit support*

Individual entrepreneurs involved in coconut based enterprises in the islands perceived that norms related to collateral security for availing credit for making investment to manage their enterprises often are not quite supportive. This has caused difficulty for the entrepreneurs to avail credit and also incentives/subsidy from various governmental agencies. Credit support to the entrepreneurs is to be made more effective by evolving appropriate norms for sanctioning credit by taking into account the prevailing socio-economic situation in the islands.

▶ *xi. Transportation*

Transportation channels for the products to find markets in main land and other countries are not very conducive for the entrepreneurial development. Exclusive channel for cargo movement for island produces is essential for the successful ventures from islanders.

▶ *xii. Farmer Producer Organizations (FPOs)*

The average land holding size in the islands is only 0.27 hector. Hence, it imperative that group approach is facilitated among the small and marginal farmers of the island to enable them to overcome the resource limitations and to effectively make use of technologies for higher productivity and income from coconut farming. As has been already mentioned, individual entrepreneurs involved in production and marketing of coconut based products in the islands are facing challenges, especially problems related to marketing, to effectively manage their enterprises. Department of Agriculture, UT of Lakshadweep has facilitated formation of coconut farmers' societies in the islands in connection with organic certification programme. However, these societies are almost defunct and are not active enough to take up various interventions to strengthen the coconut sector. It is necessary that in all the islands the existing FPOs are revitalised and new farmer collectives facilitated to take up coconut production, processing and marketing initiatives. Self help groups of women also need to be facilitated and support given to take up coconut based microenterprises.

▶ *xiii. Capacity building and Co-ordination*

Individual entrepreneurs, Farmer Producer Organisations and women SHGs in the Lakshadweep islands need to be supported through capacity development initiatives for production and marketing of coconut value added products. Institutions such as ICAR-CPCRI and ICAR-KVK Lakshadweep, can organise training programmes on value addition in coconut as part of entrepreneurship development programmes on value chain management in coconut.

Entreprereneurship developmet programmes for selected young farmers/ entrepreneurs from diffrerent islands have alreday been scheduled to be conducted at ICAR-CPCRI Kasargod and KVK Baramathi with the support of National Horticulture Board. Interventions for enhancing efficiency of coconut sector in Lakshadweep islands to be effective, need concerted and coordinated efforts of various stakeholders including research institutions like ICAR-CPCRI, ICAR-CIARI, KAU, development agencies such as Department of Agriculture, Department of Industries, Department of Rural Development and Department of Co-operation, Lakshadweep Development Corporation Ltd.(LDCL) under UT administration, ICAR- KVK Lakshadweep, Coconut Development Board, Local self Governments (village Dweep Panchayats and Lakshadweep District Panchayat), coconut Farmer Producer Organizations, Women Self Help Groups and private entrepreneurs.

Conclusion

Coconut is very closely associated with the socio-economic and cultural life of the people of Lakshadweep islands. The potential for achieving higher productivity and income from coconut farming has not been fully realized in these islands due to various reasons. Crop management technologies and technologies available for value addition through product diversification in coconut can be effectively utilised for enhancing income and improve livelihood of people of Lakshadweep islands. Hence, it is highly relevant and significant to formulate and conduct entrepreneurship development programmes on coconut production and processing of coconut and subsidiary crops to benefit farmers and youth from the islands. Taking into cognizance the resource limitations including the fragmented holdings, FPOs and women SHGs are to be facilitated among growers of the islands to make the coconut based interventions effective. Co-ordinated efforts of various agencies are also essential for effectively implementing the interventions for sustainable development of farm sector in Lakshadweep islands. ■

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I, Mini Mathew, hereby declare that the particulars given above are true to the best of my knowledge and belief.

Sd/

Date : 01-03-2019

(Mini Mathew)

Role of Coconut Development Board in entrepreneurship development and Value Addition

Jnanadevan R
Dy. Director, Coconut Development Board, Kochi - 11

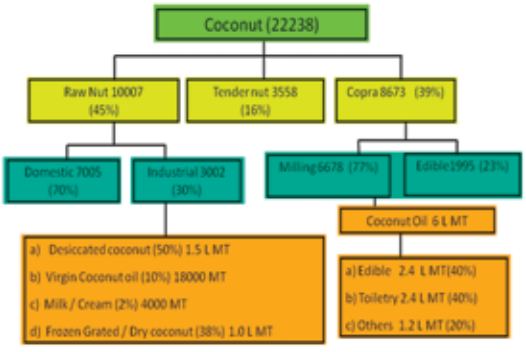
Introduction

1. Coconut Development Board (CDB) came into existence in 1981, under an Act of Parliament, as the mandated organization for integrated development of coconut industry, under the Ministry of Agriculture and Farmers Welfare, Government of India. Vision of the Board is integrated development of coconut cultivation and industry in the country so as to make the coconut economy sustainable and globally competitive. The mission envisaged is to achieve targeted production and productivity in coconut and promoting product diversification by-product utilization with the active participation of State Governments Departments and other agencies. Establishment of CDB opened up new vistas in the history of coconut cultivation and industry in the country. Three and half decades of CDB can be delineated into two stages considering the shift in strategy in its approach. The first two and half decades earmarked the former stage. The last one decade, being the second stage. In the first stage coconut cultivation expanded in nontraditional areas especially in north eastern and central region of India, thereby total area under coconut in the country witnessed unprecedented increase. Infrastructure network was created in the length and breadth of the country and thus Board showed its Pan India presence as a supplier of quality planting material throughout the country. At the time of setting up of Coconut Development Board in 1981-82, the area and production of coconut in the country remained at 1.91million ha and 5940 million nuts. In 2017-18 coconut area has increased to 1.97 million ha producing 20440 million nuts with a national average productivity of 10345 nuts per ha per annum, the production and productivity being the highest in the world. The per capita availability of coconut has considerably increased to in the country.

Processing coconut is a means of increasing farm income. Many developments have taken place in the post harvest processing sector in India. The R&D efforts of the Board in the last decade which resulted in development of technologies for many new value added products has helped India to stand among other countries in technology development. Income from processing coconut in to traditional products is low. Hence product diversification for high value added products and entrepreneurship development

is one of the approaches that could increase farm income and employment opportunities in coconut sector. Though India is the largest coconut producing country in the world, utilization of coconut in to value added products is low compared to other major coconut growing countries. Apart from enhancing the supply of coconut in the country, the Board played a productive role in the field of post harvest processing of coconut. The copra-coconut oil centered industry has been diversified and tremendous progress is achieved in the field of product diversification and by-product utilization of coconut. Many technologies were developed in association with premier Research Institutions in the country. Technologies developed for the manufacture of various products like; coconut cream, spray dried coconut milk powder, packed and preserved tender coconut water, virgin coconut oil ,preserved and packed neera and its downstream products, and by-products like; coconut water based vinegar, nata-de-coco, industrial utilization of wood for the manufacture of particle boards etc. are the important achievements of the Board. For achieving price stability and increased income, the strategy is to divert at least 20-25 percentage of the total production of matured nuts for value added products other than traditional products as copra and coconut oil.

Coconut consumption pattern in India (2017 estimate)



2. Coconut Product Utilization in the Country for 2017

It is estimated by the Board that 45% of the production is used as raw coconuts. Out of which 70% for domestic consumption and 30% for industries for production of desiccated coconut, virgin coconut oil, coconut milk/ cream, frozen grated/ dry coconut, etc. The rest 39% is converted to copra of which about 23% is consumed directly for various edible purposes. Coconut oil is extracted for edible, toiletry and other purposes from the balance 77% of the copra. Remaining 16% of the total coconut production in India is consumed as tender coconut.

3. Policies of CDB to Promote Farm Productivity and increase Farmer's Income:

In India, development programmes and policies in coconut are mainly taken up by Coconut Development Board. Production and distribution of quality planting materials, expansion of area under coconut especially in non-traditional States, promotion of adopting integrated nutrient management, pest management and coconut based farming systems by establishing farmer participatory demonstration plots, replanting and rejuvenation of old and senile coconut gardens, technology mission on coconut for promoting value addition, facilitating formation and handholding farmer producer organizations for promoting production, processing and marketing of coconut are the major policies adopted in India for promoting coconut sector. Formation of farmer's collectives in coconut sector is encouraged by the Government of India for aggregation, farm level processing and also to facilitate taking collective plant protection measures.

4. Roles of Coconut Development Board to enhance production with respect to value addition:

Technology development in value addition was in infant stage in India during 1990s. Thereafter with the intervention of CDB, product diversification is initialized. However, the speed and direction of post harvesting technology and value addition is yet to be in line with that of other countries like Philippines, Sri Lanka or Thailand. Introduction of CDB scheme Technology Mission on Coconut (TMoC) has given momentum to this area and now India possesses many technologies in value addition CDB plays a pivotal role by acting as a facilitator for increasing the production and productivity and promoting product diversification and bi-product utilization in coconut. Technical and financial support was given to establish processing units with processing capacity of 12% of total production of coconut in the country. We have to achieve a quantum jump in export also in order to minimize the risk of the farmers caused by excessive dependency on coconut oil. This can be achieved through a concerted programme for product diversification to ensure at least 25% of the

total coconut production is used for value added products other than coconut oil. Various activities of the Board for promotion of product diversification and by-product utilization are given below:

4.1 Development of technologies for innovative products; The post harvest management, product diversification and by-product utilization received an impetus after the Board' started implementation of a special scheme "Technology Mission on Coconut (TMoC). The scheme is being implemented by CDB with more emphasis to promote product diversification and value addition in coconut. The industry has been benefitted with diversified products which in turn are helping to de-link the coconut oil-copra centered market. Several value added products are developed and promoted by the Board through sponsored research programmes under TMoC. Board is extending financial assistance for development of new technologies on project basis through reputed research institutions. Virgin Coconut Oil by wet processing, Spray Drying of Coconut Milk, preservation and packing of tender coconut water, Coconut Vinegar Production from Matured Coconut Water, nata-de-coco, flavored coconut milk, preserved and packed neera are few economically desirable technologies developed in the field of product diversification of coconut. Technologies available with the Board are transferring to potential entrepreneurs on need basis on payment of technology transfer fee fixed for different value added products.

4.2 Financial support for setting up of Coconut Based Industries; Financial support is extended to the tune of 25% of the project cost limited to Rs.50 lakh per project as back ended subsidy. Prospective entrepreneurs/ NGOs/ Co-operatives/ FPOs can avail the benefits of this scheme for setting up of coconut based industries/ units for manufacturing of coconut based value added products such as desiccated coconut powder, virgin coconut oil, coconut milk, coconut milk powder, flavored coconut milk (ready to drink), tender coconut water, coconut shell powder, charcoal and activated carbon and any other value added coconut products. Technical and financial support was given to establish 484 processing units with processing capacity of 2754.10 million nuts per year.

4.3 Technical advice to entrepreneurs for project preparation and setting up of coconut based processing units; Board is providing technical guidance to potential entrepreneurs for preparation of Detailed Project Report (DPR) and guidance regarding machineries, quality specifications, export potential, marketing prospects etc. Board has empanelled few agencies for assisting entrepreneurs in preparation of DPR in this regard. As such Board is providing technical and financial support in all aspects of coconut value chair right from farmer to the traders, processors, distributors, end consumers and exportes.

4.4 Technology Demonstration/Quality testing lab; CDB has the Technology Development Centre in at Vazhakulam, Aluva, Ernakulam Kerala is engaged in the development and demonstration of technologies for product diversification and by-product utilization of coconut. The centre is devoted to product development, microbial analysis of coconut based products, apart from imparting skill development programmes to interested entrepreneurs and self help groups for acquiring technologies on post harvest coconut processing and process demonstration. Many value added and novel products were developed by the institute. Through sponsored research projects through other reputed research organizations CIT has developed technology for processing and packing of neera and various downstream products like neera sugar, neera jaggery, neera honey etc. Food products like sweet and spicy chips, sweet chunks, chocolate, cookies, flavored juice, ice cream and milk spread are the other innovative products contributed by CIT has to the coconut product basket. The Centre is engaged in the development and demonstration of technologies for product diversification and by-product utilization of coconut. The Institute has received the recognition of NABL. Facilities for chemical analysis of copra, coconut oil and coconut vinegar are also available at the CDB Institute of Technology (CIT)

5. Market promotion, market intelligent services and Export Promotion Council

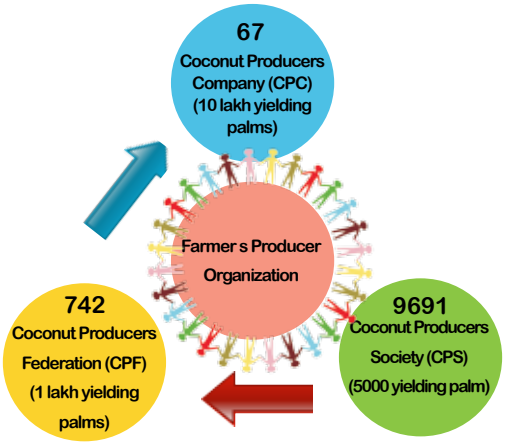
5.1 Coconut and coconut products have very good market potential within as well as outside the country. For expanding the market for Indian coconut products across the globe, the Board is extending support to the industry through the programmes viz; Support for sales outlets/ kiosks for value added coconut products, Facilitating participation in domestic exhibitions/ trade fairs and buyer-seller meets in metropolitan cities within the country, Encouraging coconut product exporters with Award for export excellence, Overseas and domestic industrial exposure visits to prosperous manufacturers, Organizing workshops/ seminars for entrepreneurs and exporters.

5.2 CDB is exploring new marketing strategy for directing coconut products to all domestic and international markets. India's domestic market is bigger than that of USA. More than 78% of India's urban population is located in the 63 major cities. CDB is aiming at introducing, making available and marketing maximum value added coconut products in these cities available with the processors. In the international markets, countries like China, India, USA, Indonesia and Brazil are top five most populous countries. Products of all countries are now available in all potential markets and good quality Coconut products of India could also be made available to international markets. 'Niche' markets for pharmaceutical, nutraceutical, and cosmecuetical products from coconut are emerging, giving further boost to Indian opportunities.

5.3 CDB was designated as Export Promotion Council during the year 2009. India's export is growing at 30% per annum since 2009. As Registration Cum Membership Certificate (RCMC) from the Export Promotion Council concerned is mandatory for exports, to enable exporters to avail the various benefits under the Foreign Trade Policy and duty neutralization schemes of the Department of Revenue, it is mandatory that prospective exporters of coconut products (other than those made from coconut husk and fiber) get registered with the Coconut Development Board. In the capacity of EPC, Board has so far given registration to 3721 exporters under its fold. This has enabled the Board to monitor the export scenario closely which is an indication of country's growth in the sector. It is also important to tap the market for value added products like packaged tender coconut water, virgin coconut oil, desiccated coconut, coconut milk, milk powder, cream and coconut palm sugar in the international market. Export promotion activities of CDB need to be strengthened to achieve this goal. India is aiming at a quantum jump in export and look forward to have bigger share in the international trade. It is also necessary to give utmost attention to quality assurance to Indian products to make them globally acceptable and to cost effectiveness to make it globally competitive. Issuing Registration-Cum-Membership Certificates to exporters, facilitating participation in International Trade Fairs, analyzing market potential and market trends for the benefit of exporters, providing useful information and assistance to exporters in developing and increasing their exports, providing professional advice in areas such as technology up gradation, quality and design improvement, standards and specifications, product development, packaging etc; providing data on the exports and imports of the country, and other relevant trade data, organizing Seminars, Conferences and Buy seller meet. EPC closely monitors the export of products from India. Major Coconut Products exported from India are Activated Carbon, Fresh coconut, coconut oil, desiccated coconut powder, dry coconut, copra, and grated coconut. Other products exported are coconut based hair oil, hair cream, coconut chutney powder, coconut cookies, coconut biscuits, coconut based toilet soap, coconut shell ice cream cup etc

6. Facilitating three tier Farmer Producer Organization (FPO) in coconut sector.

Farmer participatory cluster approach introduced by CDB in implementation of productivity improvement programmes helped to built strong relation between farmers and Board. This further led to formation of three tier Farmer Producer



Organizations (FPOs) which was a beginning in the hand holding and thereby led to the empowerment of unorganized coconut farmers. This novel extension approach / strategy formation of three tier Farmers Producers Organization (FPO) with Coconut Producers Societies (CPS) at primary level and integrate them to form Coconut Producers Federation (CPF) at intermediate level and Coconut Producer Company (CPC) at apex level. CDB acts as a facilitator for formation of this approach. A Coconut Producer Society (CPS) consists of around 50 farmers and 5000 coconut palms and 20 such societies form Federations and 10 Federations form a Company. Thus a company which is formed by 10,000 farmers will be producing around 8 crore coconut from their jurisdiction. The main role of the Company is to establish coconut based entrepreneurs in setting up processing unit for production of value added products from coconut procured from the member farmers and its marketing. Efforts of the Board on this line have been internationally appreciated and many countries expressed interest to follow the path of Indian strategies.

7. Future thrust

The developmental activities of the Board contributed to increase in area, production and productivity and technology development. But more is to be done by the Board for the development of coconut industry in the country. Emphasis on product diversification need to be reoriented. Technology development in post harvest processing sector has to be intensified to minimize the dependence of coconut industry on coconut oil alone. Market promotion activities are to be strengthened. The Board has only made a beginning in this line and it has to be continued further so that more and more value-added coconut products would appear in the market and coconut farmers could fetch remunerative price for their produce. Priority areas where CDB propose to give more thrust in future will be are to promotion of more entrepreneurship development in value addition, improvement in quality standards matching with international standards, adoption of new marketing strategy for tapping domestic and international markets. More focus on popularizing the health, nutrition and wellness benefit of coconut in the national and international scenario, continuing the aggregation of farmers into FPOs as a platform for empowerment are areas of importance to push the Indian coconut sector to the forefront. Urban Indian markets are bigger than US market. Coconut products are in demand even in non-growing areas. Image bestowed of late to coconut products as a functional food which imparts health,

nutrition and wellness commands niche markets in health sector. In the era of globalization products of all countries are available in all potential markets. The small holdings size and scattered nature of marketable surplus could be overcome through aggregation of produces by FPOs. This could help to avoid middlemen to a greater extent and will realize better income. They have been empowered to work with the support of their fellow groups in adoption of technologies including scientific coconut cultivation. Coconut products have greater demand across India and abroad. Domestic and international markets should be explored equally for the benefit of farmers and they should be equipped for export oriented production strategy. Concerted efforts of all stake holders like development agencies, research institutions, farmer groups, FPOs and entrepreneurs are needed to attain this goal.CDB unites its activities in such a way to elevate India as the world leader in processing for value addition and export in future. ■

Coconut Oil Benefits for Brain, Heart, Joints and more

Dr. Josh Axe

To date, there are over 1,500 studies proving coconut oil to be one of the healthiest foods on the planet. Coconut oil benefits and uses go beyond what most people realize, as coconut oil — made copra or dried coconut flesh — is a true superfood.

Research has finally uncovered the secrets to this amazing superfood: namely healthy fats called medium-chain fatty acids (MCFAs). These unique fats include:Caprylic acid, Lauric acid and Capric acid

Around 62 percent of the oils in coconut are made up of these three healthy fatty acids and 91 percent of the fat in coconut oil is healthy saturated fat. This fat composition makes it one of the most beneficial fats on the planet, as the USDA nutrient database shows.

Most of the fats we consume take longer time to digest, but MCFAs found in coconut oil provide the perfect source of energy because they only have to go through a three-step process to be turned into fuel vs. other fats that have to go through a 26-step process!

Unlike long-chain fatty acids found in plant-based oils, MCFAs are easier to digest, not readily stored as fat, antimicrobial and antifungal, smaller in size, allowing easier cell permeability for immediate energy and processed by the liver, which means that they're immediately converted to energy instead of being stored as fat. All of this shows why this oil made from coconut copra makes for a true superfood, and it's why coconut oil benefits are so plentiful and amazing.

Proven Coconut Oil Benefits

According to medical research and the USDA nutrient database, coconut oil benefits the body in the following ways:

▶ *Proven Alzheimer's Disease Natural Treatment*

The digestion of MCFAs by the liver creates ketones that are readily accessible by the brain for energy. Ketones supply energy to the brain without the need of insulin to process glucose into energy.

Recent research has shown that the brain actually creates its own insulin to process glucose and power brain cells. As the brain of an Alzheimer's patient loses the ability to create its own insulin, the ketones from coconut oil could create an alternate source of energy to help repair brain function.

▶ *Prevents Heart Disease and High Blood Pressure*

Coconut oil is high in natural saturated fats. Saturated fats not only increase the healthy cholesterol (known as HDL cholesterol) in human body, but also help convert the LDL "bad" cholesterol

into good cholesterols. By increasing the HDL in the body, it helps promote heart health and lower the risk of heart disease. Coconut oil benefits the heart by lowering high triglycerides.

▶ *Treats UTI and Kidney Infection and Protects the Liver*

Coconut oil has been known to clear up and heal urinary tract infection (UTI) and kidney infections. The MCFAs in the oil work as a natural antibiotic by disrupting the lipid coating on bacteria and killing them. Research also shows that coconut oil directly protects the liver from damage. Coconut water also helps hydrate and support the healing process. Doctors have even injected coconut water to clear up kidney stones. Coconut is a powerful superfood, which is evident given all these tremendous coconut oil benefits.

▶ *Reduces Inflammation and Arthritis*

In a study in India, the high levels of antioxidants present in virgin coconut oil (VCO) reduced inflammation and treated arthritis more effectively than leading medications. In another recent study, coconut oil that was harvested with only medium heat was found to suppress inflammatory cells. It worked as both an analgesic and anti-inflammatory.

▶ *Cancer Prevention and Treatment*

Coconut oil has two qualities that help it fight cancer: one, because of the ketones produced in its digestion. Tumor cells are not able to access the energy in ketones and are glucose-dependent. It's believed that a ketogenic diet could be a possible component of helping cancer patients recover. Two, as the MCFAs digest the lipid walls of bacteria, they also can kill the helicobacter pylori bacteria that has been known to increase the risk of stomach cancer. Even in studies where cancer is chemically induced, the introduction of coconut oil prevents cancer from developing.

▶ *Immune System Boost (Antibacterial, Antifungal and Antiviral)*

Coconut oil contains lauric acid (monolaurin), which is known to reduce candida, fight bacteria and create a hostile environment for viruses. Many diseases today are caused by the overgrowth of bad bacteria, fungi, viruses and parasites in the body. You can replace grains and sugar in your diet with coconut oil as your natural fuel source when you're sick. Sugar feeds the growth of bad bacteria. Instead, take one tablespoon of coconut oil three times daily when sick, and consume plenty of vegetables and bone broth as well.

▶ *Improves Memory and Brain Function*

In a 2004 study published in the Journal of Neurobiology of Aging, researchers found that the MCFAs in coconut oil improved the memory problems in their older subjects.

Across all the patients there was a marked improvement in their recall ability after taking this fatty acid. As the MCFAs are absorbed easily in the body and can be accessed in the brain without the use of insulin. Thus, they are able to fuel brain cells more efficiently.

▶ *Improves Energy and Endurance*

Coconut oil is easy to digest and also produces a longer sustained energy and increases metabolism. When taking a quality unrefined coconut oil, you can get the most coconut oil benefits as its MCFAs are sent directly to the liver to be converted into energy. Today, many triathletes use coconut oil as their source of fuel during training and races for long-distance events. You can make a homemade energy fuel by mixing coconut oil, raw honey and chia seeds together. Simply put together one tablespoon of each and consume 30 minutes prior to exercise.

▶ *Improves Digestion and Reduces Stomach Ulcers and Ulcerative Colitis*

Coconut also improves digestion as it helps the body absorb fat-soluble vitamins, calcium and magnesium. If coconut oil is taken at the same time as omega-3 fatty acids, it can make them twice as effective, as they are readily available to be digested and used by the body.

Coconut oil can help improve bacteria and gut health by destroying bad bacteria and candida. Candida imbalance especially can decrease stomach acid, which causes inflammation and poor digestion. All this together means coconut oil benefits digestive

health and helps treat or prevent stomach ulcers and ulcerative colitis.

▶ *Reduces Symptoms of Gallbladder Disease and Pancreatitis*

The MCFAs of coconut oil do not need the pancreatic enzymes to be broken down, so taking coconut oil eases the strain on the pancreas. Additionally, this superfood is so easy to digest that it has been known to improve the symptoms of gallbladder disease as well. Replace other long-chain fats with coconut oil to improve gallbladder and total body health.

▶ *Improves Skin Issues (Burns, Eczema, Dandruff, Dermatitis and Psoriasis)*

Coconut oil is wonderful as a face cleanser, moisturizer and sun screen, but also it can treat many skin disorders. The fatty acids (caprylic and lauric) in coconut oil reduce inflammation internally and externally and moisturize, making them a great solution for all types of skin conditions. It protects the skin and has many antioxidants that make it ideal for healing the skin. In addition, the antimicrobial properties balance out the candida or fungal sources that can cause many skin conditions. There's so much unrefined coconut oil can do for skin.

▶ *Prevents Gum Disease and Tooth Decay*

Oil pulling with coconut oil has been used for centuries as a way to cleanse the mouth of bacteria and help heal periodontal disease. Coconut oil is one of the most effective oils for oil pulling due to its high concentration of antibacterial MCFAs. By swishing the oil in your mouth, the oil denatures the bacteria and sticks to it. Removing oral bacteria greatly reduces your risk of periodontal disease. If you want to heal your gums and repair your teeth, I recommend coconut oil pulling three times a week for 20 minutes a day.

▶ *Prevents Osteoporosis*

Oxidative stress and free radicals are the two biggest culprits of osteoporosis. Since coconut oil has such high levels of antioxidants, which help fight free radicals, it is a leading natural treatment for osteoporosis. Another of the amazing coconut oil benefits is that it increases calcium absorption in the gut. Research on osteoporosis has found that coconut oil not only increases bone volume and structure in subjects, but also decreased bone loss due to osteoporosis.

▶ *Improves Type II Diabetes*

When cells refuse to respond to insulin and no longer take in glucose for energy, then they're considered insulin-resistant. The pancreas then pumps out more insulin to compensate and creates an overproduction cycle. Insulin resistance is the precursor to type II diabetes. The MCFAs in coconut oil help balance the insulin reactions in the cells and promote healthy digestive process. They take off the strain on the pancreas and give the body a consistent energy source that is not dependent on glucose reactions, which can prevent insulin resistance and type II diabetes.

▶ *Coconut Oil for Weight loss*

Because of the energy-creating abilities of coconut oil and the fact it's a no-carb oil, it is no wonder that it is beneficial in losing weight. It helps burn fat and calories, decrease appetite, and in studies it was especially helpful in losing belly fat. Coconut's ability to help you shed fat has been well-established. A 1985 study published in the Journal of Toxicology and Environmental Health proved that a single injection of capric acid resulted in "initially rapid, then gradual decrease in food consumption and a parallel loss of body weight" in male rats.

It might seem counterintuitive to assume that eating coconut oil (a fat) will contribute to fat loss, but it is actually quite logical. The key to understanding this phenomenon lays in the multidimensional ability of the MCFAs to control a variety of physiological processes.

For example, in the 1985 study mentioned above, it was discovered that capric acid shows significant improvements in thyroid function, helps lower resting heart rate and assists your body in burning fat for energy. More recently, the Obesity Research Journal published a study from Boston University Medical School that gives us a clue why MCFAs have fat-burning ability.

Testing the effects that MFCAs have on fat breakdown, adipose (fatty) cells in rats were pretreated with caprylic acid. They observed that fat breakdown occurred at such a significant level that it literally mimicked the characteristics of fasting. Fasting, in this sense, is not to be regarded as negative, but positive in that the body uses its energy reserves most effectively and speeds up the breakdown of needless fat reserves. In the words of the researchers who conducted this study, "Such changes could contribute, in part, to weight loss in animals and humans associated with dietary medium-chain fatty acids."

▶ Building Muscle and Losing Body Fat

MCFAs aren't just good for burning fat; they are also great for building muscle. The MCFAs found in coconut are also used in popular muscle-building products like Muscle Milk™. The vast majority of heavily produced supplements, however, use processed forms of MCFAs. By eating actual coconuts instead, you get the "real deal." I recommend adding three tablespoons of coconut oil to a muscle-building shake daily.

▶ Coconut Oil Benefits for Hair Care

If you have dandruff or dry hair, coconut oil has the perfect fatty acids to help improve these conditions. In fact, there is so much coconut oil can do for hair. You can make homemade coconut lavender shampoo to improve your hair and use straight coconut oil as an all-natural hair conditioner. To get rid of dandruff and thicken hair, massage one tablespoon of coconut oil mixed with 10 drops of rosemary essential oil into your scalp for three minutes. Then shower 30 minutes later.

▶ Candida and Yeast Infections

A study published in the journal Antimicrobial Agents and Chemotherapy found the capric acid and lauric acid in coconut oil made for an effective natural treatment for candida albicans and yeast infections. To effectively kill candida and treat yeast infections, remove processed sugar and refined grains from your diet and consume plenty of healthy fats. Take one tablespoon of coconut oil three times daily as a supplement.

▶ Coconut Oil for Anti-Aging

According to research published in the medical journal Food and Function, coconut oil improves antioxidant levels and can slow aging. Coconut oil works by reducing stress on the liver and lowering oxidative stress.

Also, researchers found that coconut oil may support detoxification because of how it works with the liver. To naturally slow aging, take one tablespoon of coconut oil with antioxidant-rich berries for breakfast. You can also apply it directly to skin for additional benefits and smoothing.

▶ Coconut Oil for Hormone Balance

Using coconut oil benefits your hormones as well! Coconut oil may help naturally balance hormones because it's a great source of saturated fat, including lauric acid. Studies have found that coconut oil may be an excellent fat to consume during menopause and also may have positives effects on estrogen levels.

In order to naturally balance hormones, reduce sugar and grain consumption and load up on healthy fats from coconut, avocado, flax seeds and ghee. You can also consume other coconut forms, such as coconut butter or coconut water.

The benefits of coconut oil are immense. Coconut oil helps the body in so many ways. Remember to use coconut oil in place of other cooking oils whenever you can since it has an extremely healthy fat composition, and always opt for the pure coconut oil to get the best coconut oil benefits.

Source: Dr.Axe.com:

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Nicobar tribals with the distributed inputs during demonstration of coconut climbing devices in the coconut garden at Harminder Bay, Little Andaman

Coconut Climbing Devices and Dehuskers

Drudgery Reducing tools for the Nicobarese Tribal Farmers of Bay Islands

Ajit Arun Waman[1]*, Pooja Bohra[1], B. Augustine Jerard[1] and H.P. Maheshwarappa[2]

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Andaman and Nicobar Islands in the Bay of Bengal are a group of 572 tropical islands and isles. The islands have diversified plant genetic resources of economic and ecological significance, of which coconut is the most important commercial crop occupying more than half of the cultivated area in the islands.It is cultivated in about 22,000 ha out of 46,000 ha of land under Agriculture in Andaman and Nicobar islands. In Nicobar group of islands alone, coconut is cultivated in about 14,500 ha area. Coconut is an indispensible part of day to day life of Nicobarese tribe of these islands. The community is the main inhabitant of the Nicobar groups of islands, while few settlements in the Andaman group of islands do exist.

Coconut plantations in Nicobar group of islands are very dense as the fallen nuts often are allowed to regenerate giving rise to natural groves of coconut. These groves and plantations are generally the property of Nicobarese community. Systematic coconut farming is rarely adopted by the tribal communities. Mostly only the fallen nuts are collected, which are either used for own purpose or are sent for processing into various products. Except for occasional harvesting of nuts from the palms, no intercultural operations are generally adopted by the community.Nicobarese pigs, which are the symbol of prosperity among the Nicobarese tribals, are also found to relish coconuts here. The tribal people also

Distribution of coconut dehuskers to Nicobarese tribal women

use coconuts to feed the pigs.Coconut kernel and oil are mainly used in several culinary preparations of tribal people. Tender coconut is also relished by most people.

In the recent past, coconut based industries are being promoted in the islands and few industries including coconut oil, virgin coconut oil, rope and coir based products etc. are being operated. However, like other parts of the country, there is shortage of skilled manpower for carrying out various operations. Considering the opportunities for creating livelihood security of these tribal farmers, skill development and provision of suitable inputs is of great importance.

For facilitation of skill development among the youth, field demonstrations of these devices were carried out since 2016 under the ICAR- All India Coordinated Research Project on Palms, which have been well received by the native aboriginals of these islands. Three field demonstrations on coconut climbing devices and two demonstrations on use of coconut dehuskers have been conducted, which was attended by 145 Nicobarese including 52 female participants. Local youth including women actively participated in demonstrations and tried on these devices.

The tribal people named the climbing device as chaklaak considering the sound the device produces while climbing. They opined that the climbing devices are very useful for them as they reduce their drudgery while harvesting the nuts. They also indicated that fixing the device on palm before climbing takes some time but they generally work in groups in which one person helps in fixing the devices on each palm, while two climbers operates the devices on the palms. Interactions with the participants of various training programmes suggested that they could climb about 25-30 palms in a day. Though few individuals claimed that they used to climb palms without using these devices, they experienced that use of these devices had reduced their labour. Coconut dehusking is generally undertaken by tribal men using crow bar and women are rarely involved in this activity. However, the manually operated dehuskers were liked by the women farmers, which were handy and easy to operate. Therefore, a number of farm women have started involving themselves in the dehusking operation.

In order to reduce the drudgery involved in harvesting and postharvest handling of coconut, ICAR-CIARI has been distributing palm climbing devices and coconut dehuskers to the Nicobarese farmers since the past three years under Scheduled Tribe Component (erstwhile Tribal Sub Plan). So far,75 palm climbing devices and 70 manual dehuskers have been distributed to the Nicobarese tribals of Harminder Bay village of Little Andaman island.The events were attended by First Captains Shri. Fred Levi (former) and Smti. Kitty Hilton (present), Shri. YosephYencis, Third Captain of the village and Shri. Festus Nathaniel, Secretary, Tribal Council, who lauded the initiative of carrying out demonstrations and narrated the utility of these devices to the community. To recognize the efforts of the Institute in providing appropriate technical know-how and inputs to the tribal farmers, the Tribal Council has given Appreciation Certificates to the scientists involved, which clearly indicate the usefulness of this initiative.

Though the devices are small interventions, they have been instrumental in reducing the drudgery involved in harvesting and postharvest handling of coconut. This not only help them in harvesting the produce for self-consumption, but also facilitating them in marketing of coconut produce, thereby generating livelihood in the remote parts of the country.

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Healthy lifestyle with Virgin Coconut Oil

Coconut oil has been a hot topic of study for many years because of its paradoxical biochemical structure. Being made up of saturated fats, it was naturally presumed to be unhealthy for years until scientists recently discovered the wonderful truths about its various benefits. This oil, has recently been discovered to be beneficial beyond limits. Extra virgin coconut oil' which is free of hydrogenation, refinement or deodorization is known to have numerous benefits.
This oil has been used since centuries in Asian countries. This article compiles a list of ways, to add virgin coconut oil into daily routine, be it internally or externally, for a healthier lifestyle.

Cooking with Virgin Coconut Oil

VCO contains healthy saturated fats known as Medium Chain Fatty Acids or Medium Chain Triglycerides which can boost fat burning efficiently and provide energy to the body and the brain. It also raise the good HDL cholesterol in blood, which is linked to reduced heart disease risk. Virgin coconut oil is easy to digest, quickly absorbed by the liver, burned for fuel and increases metabolism, thus helping in weight loss.

Cooking and baking with coconut oil proves to be healthier than another cooking oil. Due to the saturated fats, coconut oil is very stable and withstands high cooking temperatures. It can even be used for roasting and frying. However, it is to be mentioned that unrefined coconut oil has a strong flavour and aroma, but if you're not into that you can easily use a refined coconut oil that's neutral in taste and aroma. Virgin Coconut oil is also rich in lauric acid, and this agent contains antiviral, antibacterial, and antiprotozoal properties. It also has capric acid, which helps protect from infections. The fatty acid composition of Virigin coconut oil is given below.

Fatty Acid	Percentage
Lauric Acid	50.33
Caproic Acid	14.32
Capric Acid	10.25
Myristic Acid	12.91
Palmytic Acid	4.92

Oil pulling

Oil pulling is an age-old Ayurvedic practice, a good way to remove bacteria and to promote healthy teeth and gums and coconut oil works for the process. Coconut oil pulling is an amazing oral detoxification procedure where you simply swish a tablespoon of oil in your mouth for about 10 to 20 minutes. It sucks the toxins out of the mouth and creates a clean antiseptic environment. The antibacterial nature of coconut oil work on killing germs in mouth. It is pulling toxins from your mouth before they get a chance to make their way to the rest of the body. Oil pulling proponents say it gives more energy, helps fight bad breath, and can even whiten teeth. This practice is said to ease a litany of ills from migraines to asthma. In addition, a recent study found that pulling coconut oil for at least seven days had the ability to "significantly reduce levels of plaque and gingivitis". Recent research found that massaging coconut oil into your gums for ten minutes daily - for at least three weeks –kills cavity causing bacteria and significantly reduces tooth decay and plaque build-up.

Skin & Hair Care

Coconut oil can work wonders with dry and damaged hair. When applied on skin, it absorbs quickly and moisturizes the skin. Unlike other chemical moisturizing creams, Extra Virgin Coconut Oil (EVCO) does not leave a thick, greasy or overbearing residue.

EVCO is excellent for increasing hair's strength and vitality, and makes hair shiny and free of splint ends and damage. Using one tablespoon of virgin coconut oil will nourish hair and scalp, reduces dandruff, protect hair and preventing breakages. Adding this natural oil to your routine in place of overly processed, chemical ridden products is a great way to lessen your exposure to potentially hazardous substances, and it works as good as, if not far better than, any other comparable man made option out there.

EVCO can also be used as under eye cream. Using coconut oil around your eye area can prevent wrinkles and reduce puffiness and under-eye bags. It can be used as a body lotion, Cuticle cream, Bath Oil, Shaving cream, Massage oil, Make up remover etc. Coconut oil is naturally SPF 4 and can be a remedy for chapped lips. When used in massaging the skin with other creams or lotions, it can be very helpful and control dry rashes of the skin, or dry skin problems. It can also be used to control and treat eczema, psoriasis and other skin problems. It is also known to be a great wound healer. Stretch marks can be formed not just due to pregnancy but also due to excess weight gains or weight loss. In any situation, virgin coconut oil can help you get rid of stretch marks with regular massaging on that area. In most Asian countries, this is a great remedy to get rid of stretch marks

Medium-chain triglycerides (MCTs) are naturally occurring antifungal agents. They work to disrupt the lipid membrane in fungus." Rub a thin layer of coconut oil on minor cuts, scrapes, and bruises. The oil calms the area and creates a barrier against dirt and bacteria.

It is important to choose a product that is cold pressed, unrefined, organic, and basically as minimally processed as possible. While conventional deodorants and antiperspirants contain a lot of toxins and harmful effects, Due to the antibacterial properties, coconut oil deodorant is fast becoming favourite.

Turmeric-VCO tea

Turmeric has been historically known for its many health benefits, and this simple turmeric tea recipe may help you optimize your thyroid treatment plan. Turmeric health benefits include improved oxygen intake and low cholesterol levels. The magic ingredient in turmeric tea to increase its efficiency is VCO.

Ingredients

- Turmeric powder (1-2 tbsp)
- Black pepper powder (1 tsp)
- Boiling water (1 cup)
- Virgin coconut oil (1 tsp)
- Sliced ginger
- Cinnamon

Method

Once the turmeric powder and black pepper powder are in a small cup, fill the cup with boiling water. The boiling water will dissolve the pepper and turmeric. Make sure to stir the tea to let the ingredients mix together in the cup. Add a teaspoon of virgin coconut oil. This oil may also help your body absorb the curcumin with ease because turmeric has been known to be better absorbed when taken with fat soluble. Virgin coconut oil may also help you maintain a healthy thyroid gland because of its fatty acids. In order to add some extra taste and thyroid health benefits to this turmeric tea recipe, add a few slices of ginger and a pinch of cinnamon powder. Ginger is especially good for inflammation and improving thyroid function. Just like the ginger, Cinnamon also has anti-inflammatory properties. It also help regulate body's sugar levels to prevent diabetes.

Virgin coconut oil contains high levels of lauric acid, and when you consume it, this acid is converted into monolaurin, which has antimicrobial properties. It stimulates the metabolism, and this may aid in better absorption of iodine from the diet. Coconut oil has anti-inflammatory properties which can reduce the thyroid gland swelling. Include good quality virgin coconut oil in your daily diet. Can add it to your hot drinks, smoothies, and use it for cooking as well.

Coconut is a tree of heaven and is a blessing to mankind. There are numerous health benefits of Virgin Coconut Oil and adding it to the daily diet will do wonders in your life. The Latin saying "Mens sana in corpora sano" which translates to "a healthy mind in a healthy body" is more relevant now than ever. A healthy lifestyle ensures a healthy body which is a pre-requisite for a healthy mind. Healthy people are wealth of nation and the whole world will become a better place with healthy people.

Source: https://www.fitnessblender.com ● www.metdaan.com ● www.paleogrubs.com ● www.fitnessblender.com ● www.bonafideanugerahsentosa.com

Compiled by Neethu Thomas, Technical Officer, CDB State Centre, Odisha

Dr. Biswanath Rath, Vice Chairman, Coconut Development Board.

The 135th Meeting of Coconut Development Board unanimously elected Dr. Biswanath Rath as the Vice Chairman of Coconut Development Board for a period of one year. He is representing coconut farmers from Odisha in the Board.

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Workshop on Plant Health Management of Coconut

Coconut Development Board in association with NIPHM, Hyderabad conducted a National level workshop on Plant Health Management of Coconut, Challenges and Future opportunities on 14th and 15th March 2019 at NIPHM, Hyderabad .

Coconut farmers can get better yield and income if they follow recommended practices for coconut plantation and plant health, said Smt. Usha Rani, IAS, Chairperson, Coconut Development Board. She was delivering the inaugural address of the two-day national workshop. She called upon to popularise coconut cultivation as it is a highly remunerative crop with multiple uses. There is immense scope for export and value addition for the products and by products of the crop she added.

The Director General of the National Institute of Plant Health Management (NIPHM)Smt. G. Jayalakshmi, in her address stated that various invasive pests are limiting the production potential of the coconut crop. Hence, this crop is to be cultivated with the recommended practices for maintaining its health.

The deliberations and recommendation of the workshop shall be a beginning to ensure the alignment and refinement of the research outcomes for the benefits of farmers.

Ms. Anita Karun, Acting Director, Central Plantation Crops Research Institute, Kasaragod, highlighted the salient research finding of the institute which can be used by the farmers to reduce the cost of cultivation and make the crop profitable.

In his welcome address, Dr G Ravi, Director Plant Health Management (NIPHM), highlighted the objectives of the workshop and appealed to the participants to share their experiences and constructive feedback to come up with concrete recommendations for improvement in the coconut farming.

The objective of the programme was to organize a scientific deliberation and discussion on various aspects of challenges and opportunities in Plant Health Management of Coconut.

CDB officials, progressive farmers, Agro Industry representatives, members of FPOs, Agro Industry Companies, State Government representatives and Scientists took part in the programme. ■

Consume Coconut Oil for Quick Weight Loss

Coconut oil contains medium chain fatty acids and a combination of fatty acids with antioxidant properties that can help in absorption of vitamins and minerals in the body. According to nutritionist Nmami Agarwal, coconut oil has an abundant source of fatty acids that boost metabolism and improve energy levels. "Efficient metabolism helps in burning more calories, thus shedding excess weight. Coconut oil aids in reduction of abdominal fats - which acts as a host to many diseases. Coconut oil organically helps in minimising appetite and ensuring fewer calorie intake," says Nmami. Coconut oil is a healthy cooking oil which benefits overall health. *(Nmami Agarwal is nutritionist at Nmami Life) Source: https://www.ndtv.com/health/eat-this-much-coconut-oil-daily-for-quick-weight-loss-2011144.*

CDB organized exporters meet

With the objective of providing an overall understanding of the present export scenario, trade barriers tariffs and the beneficial schemes and provisions enabled by government agencies to the exporters, Coconut Development Board organized exporters meet at Coimbatore on 22nd February 2019 and at Bengaluru on 1st March 2019.

Dr. Raju Narayana Swamy IAS, former Chairman, Coconut Development Board inaugurated the seminars. In his keynote address, Dr. Swamy stated that coconut products have immense potential in the domestic and export markets and with the right technology and right quality, Indian products can harness the prospects in the global markets. He assured the exporters that as an EPC, CDB will support the exporters with information and assistance in market development.

The technical session at Coimbatore was handled by Shri. V. Sraman, Joint Director of DGFT spoke about Export incentives, advance authorization and SION Norms with respect to coconut and coconut value added products. The second session was handled by Ms. Selvannayagi, Deputy Director, FIEO and she explained about the trade tariffs and barriers with respect to coconut sector. The afternoon session covered on Export Insurance and Risk Management in Foreign Trade. The session was taken by Shri. Rajesh S, Branch Manager, ECGC, Coimbatore. The last session was handled by Shri.M. Ashokan, Assistant Commissioner of GST and Central Excise, Pollachi and Shri. S.Bhaskaran, Assistant Commissioner of

Customs Preventive Unit, Pollachi on the topic on GST and customs norms related to coconut and value added coconut products. Around 70 entrepreneurs from Tamil Nadu and Kerala attended the Seminar. The export promotion schemes of CDB were briefed by CDB officials.

The technical sessions at Bengaluru were handled by Shri. P.R. Madhusoodhanan, ITS, Deputy Director General of Foreign Trade, Bengaluru, Mrs. Soma Chaudhury, Deputy Director & Karnataka head, FIEO, Bengaluru, Mrs. Danish Minu, Assistant Director, FIEO, Bengaluru and Mr. Uday Pandit, AGM & Branch Manager , ECGC, Bengaluru who spoke on various topics related to export of coconut and value added coconut products. Around 80 entrepreneurs from Karnataka, Maharashtra, Andhra Pradesh, Gujarat etc. attended the programme.

Indian Master Climbers extended FoCT training to Jamaican farmers

As part of bilateral cooperation, Coconut Development Board facilitated FoCT training to Jamaican coconut farmers. The training programme was conducted on receiving the request from Coconut Industry Board, Jamaica through the International Coconut Community, Jakarta, Indonesia. Shri. Lee Gopinadhan and Shri. Unnikrishnan Nair from Kollam district, Kerala were the master trainers from India who went to Jamaica on 24th February 2019 and gave practical training in coconut harvesting, crown cleaning, plant protection operation etc. Trainings were conducted across the coconut growing areas in the island. Earlier Board had arranged to purchase and send 20 palm climbing machines from India to Coconut Industry Board, Jamaica.

Seminar on Coconut Cultivation Technology

Coconut Development Board, State Centre and DSP farm, Pitapally, Odisha conducted a block level seminar on coconut cultivation technology at Balianta Block on 27th February 2019 at the Seminar Hall of KVK-CIFA, Bhubaneswar. Dr. Biswanath Rath, Vice Chairman, CDB was the Chief Guest of the programme. Dr.P.N.Anand, Senior Scientist and Head, KVK-CIFA, Dr.A.K.Dash, SMS, KVK-CIFA, Shri. R.N.Das, Deputy Director i/c CDB, Smt. Neethu Thomas, Technical Officer, CDB and Shri. Pradeepta Dutta, Editor, Krishi Jagra were present during the inauguration of the programme.

Shri. R.N.Das, Deputy Director i/c CDB delivered welcome address and coconut Special Issue of Krishi Jagran was released during the occasion. Dr.P.N.Anand, Senior Scientist and Head, KVK-CIFA spoke on the co-ordinated efforts of CDB and KVK in conducting training and awareness programmes

Dr. Biswanath Rath, Vice-chairman, CDB addressed and emphasized on the importance of Coconut cultivation in Odisha and on the concerted efforts of CDB for the welfare of coconut farmers. He opined that value addition is the only way for the prosperity of coconut farmers.

Shri. R.N.Das, spoke on coconut cultivation technology and Smt.Neethu Thomas, spoke on Value addition in Coconut and explained about various value added products of coconut During the interactive session, the farmers raised queries on schemes of CDB, CPS formation and value addition. CDB officials clarified the doubts of the farmers.

Agri-Horti Show 2019

Coconut Development Board, Regional Office, Guwahati participated in 24th Annual State Level Agri Horti Show 2019 held from 1st to 4th March 2019 at Ganesh Mandir Indoor Stadium Field, Khanapara organized by Assam Horticultural Society in collaboration with Directorate of Horticulture and Food Processing, Department of Agriculture, Govt. of Assam. The programme was inaugurated by Shri Rajesh Prasad, IAS, Principal Secretary and APC, Govt. of Assam. More than 50 stalls from Department of Agriculture/Horticulture, Private Horticulturist, Floriculturists, SHGs and CDB participated in the show.

CDB Regional Office Guwahati participated in the programme and displayed different varieties of coconut, coconut based food products and handicraft products. Leaflets and booklets on coconut were distributed to the farmers. Two entrepreneurs from Assam displayed their products and services in the CDB stall. More than 1000 people visited CDB stall. Shri Rajesh Prasad, IAS, Principal Secretary and APC, Govt. of Assam & Dr. P.K. Mahanta, Director of Horticulture and Food Processing, Govt. of Assam also visited CDB stall.

Coconut Development Board participated in the technical session on coconut. Shri Lunghar

Obed, Director, RO-Guwahati chaired the session and briefed on the coconut scenario as well as the uses and importance of coconut. Shri E. Aravazhi, Deputy Director, CDB spoke on the scope of value addition and marketing of coconut and its products. Shri Kumarvel S. Development Officer, CDB,. Smt. Fariza Shireen Shaheed, Field Officer, Shri Abdul Jalil, Assistant Director, Directorate of Horticulture and FP, Govt. of Assam and Nodal Officer, (Coconut Development Board) ,Dr. P. Kalita, Retd. Director, Department of Agriculture and Shri B. K. Sarma, Retd. JDA, Agriculture department, Govt. of Assam and Dr. Mrinal Barman, Rtd. JDA, Agriculture Department, Govt. of Assam spoke during the occasion.

Consultation meet on Institutional Convergence

Coconut Development Board, State Centre, Odisha sponsored and participated in the Consultation meet on Institutional Convergence: Perspectives and implications for agricultural Development jointly organized by KVK-Khordha, ICAR-CIFA, Coconut Development Board, ABI of ICAR-NRRI, Cuttack, Farmers First Project of ICAR-CIFA, ABI of ICAR-CIFA, Krishi Jagran, Odisha & Reliance Foundation, Odisha at ICAR- CIFA, Bhubaneswar on 7th March 2019.

Dr. B.R. Pillai, Director ICAR-CIFA, Bhubaneswar delivered welcome address. Dr. S. S. Singh, Director, ICAR-ATARI, Kolkata was the Guest of Honor for the inaugural function and Dr. Biswanath Rath, Vice-Chairman, CDB was the special guest of the function. Shri. R.N.Das, Deputy Director i/c, CDB and Smt. Neethu Thomas, Technical Officer, CDB participated in the programme.

During his address, Dr. Biswanath Rath, Vice-Chairman, CDB emphasized the need for convergence of different institutions for the benefit of Odisha farmers, especially coconut farmers. Institutional convergence is essential for the success of value addition and marketing of coconut in Odisha, he said.

Dr. P.N. Anand, Senior Scientist and Head, KVK-Khurda, CIFA informed that the Friends of coconut tree training programme is being conducted in association with KVK-CIFA since the last 3 years and appreciated the efforts of CDB to make the training a big success. He explained the mode of training and shared few success stories of FoCT trainees. During the technical session on Concepts, constructs and framework of Convergence, Panel Discussion and recommendations were arranged.

Dr. S. S. Singh, Director, ICAR-ATARI; Dr. G. A. K. Kumar, Principal Scientist, ICAR-NRRI, Cuttack; Dr. B. N. Sadangi, Emeritus Scientist, ICAR-CIWA, Bhubaneswar, Odisha; Dr. Dilip Sadangi, Sr. Scientist and Head, KVK-Cuttack; Mr. Biswajith Nanda, Paradeep Phosphates Ltd. Bhubaneswar; Dr. P. N. Ananth, Senior Scientist and Head, KVK-Khordha ICAR-CIFA ;Mr. Amulya Khandai, Integrator, PRADAN (NGO) , Odisha ; Dr. J. K. Sundaray, Principal Scientist and Head, FGBD, ICAR-CIFA; Dr. S.K. Mishra, Principal Scientist, ICAR-NRRI, Cuttack; Dr. H. K. De, Principal Scientist, ICAR-CIFA ; Dr. N. K. Barik, Scientist, ICAR-CIFA; Dr. G. A. K. Kumar, Pr. Scientist, ICAR-NRRI, Mr. P. Dutta, Editor, Krishi Jagran, Bhubaneswar etc., participated in the panel discussion and technical session.

Arogya Health Fair

Coconut Development Board, Regional Office, Patna participated in the Arogya Health Fair organized jointly by the Ministry of Ayush, Government of India and Department of Health, Govt. of Bihar in collaboration with Federation of Indian Chamber of Commerce and Industry from 22nd to 24th February 2019 at the premises of Government Ayurvedic College and Tibbia college, Patna.

Arogya Health fair was inaugurated by Shri.Sanjay Kumar, Principal Secretary, Department of Health, Govt. of Bihar on 22nd February 2019. Dr.Dineshwar Prasad, Principal, Govt. Ayurvedic College welcomed the guests. Shri Ramanand Meena, Deputy Secretary, Ministry of Ayush was also present. Along with them distinguished guests from the various departments of Bihar Govt. like Ayurveda Yoga, Naturopathy, Unani and Homeopathy also attended the programme.

Manufacturing companies of Ayurved, Yoga, Naturopathy, Unani, Homeopathy medicines from different parts of the country displayed their products.

Coconut Development Board, Regional Office, Patna exhibited various products and byproducts of coconut and displayed informative banners

and posters on the importance of coconut and its products. Visitors of the Arogya Health Fair expressed their interest in coconut products and byproducts and enquired about the availability of these products in Bihar State. Officials of Coconut Development Board, Regional Office, Patna imparted detailed information to the visitors about the various schemes of the Board. More than 1000 visitors attended the fair.

Cultivation practices for coconut -April

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, if not applied during March.

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, especially under water scarce situation. The number of dripping points should be six for sandy soils and four for other soil types.

Moisture conservation

Hot dry weather continues in most of the coconut growing tracts and scarcity of water for irrigation is going to be a major problem in coconut farming. Hence, coconut growers need to judiciously use water for irrigation. Drip irrigation has to be adopted to save water. Thick mulch need to be provided in the

palm basin within two metre radius. 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

As the dry hot summer continued in this month, the pest population is all on the rise especially the weather sensitive pests such as black headed caterpillar, rugose spiralling whitefly and nesting whiteflies. Moisture deficit, diminishing relative humidity and rise in temperature favours the outbreak of these aforesaid pests. Coconut palm needs continuous moisture and nutrition for sustaining production and withstanding pressure from pest outbreak. Once the month accelerates population build up of pest coupled with moisture deficit situation would lead to palm ill health thereby reducing yield. Sustenance of palm itself would become very difficult under reduced humidity and rise in temperature. Nut setting gets reduced and palm health would divert for mere survival mechanism than for enhancing yield. Henceforth, the strategies outlined under soil and water management would turn more crucial in the general upkeep of palm health. Palm health management is therefore very crucial for the bio-suppression of black headed caterpillar and rugose spiralling whitefly.

Black headed caterpillar, *Opisina arenosella*

The coconut black headed caterpillar, *Opisina arenosella*, is a major pest distributed in almost all coconut growing tracts across the country especially along the water bodies during winter. The infested portions get dried and form conspicuous grey patches on the upper surface of the lower fronds. Severe pest damage results in complete drying of middle to inner whorl of fronds leaving a burnt appearance. Presence of black headed caterpillars, webbing of leaflets and occurrence of dried faecal matter on the leaflets are the characteristic features of pest incidence. In the absence of natural enemies in the new area of emergence, the outbreak becomes faster and expands at high speed. Damage results in tremendous reduction in photosynthetic area, decline in rate of production of spikes, increased premature nut fall and retarded growth. Extensive feeding of caterpillars causes a crop loss of 45.4% in terms of nut yield in addition to rendering the

Pest infested field

Black headed caterpillar

Goniozus nephantidis

fronds unsuitable for thatching and other purposes. Farmers need not panic and this approach is one of the classical examples of successful augmentative biological control suppressed by natural enemies.

▶ *Management*

- Regular monitoring of palm fronds for pest occurrence in endemic zones.
- Removal and destruction of 2-3 older and dried leaves harbouring various stages of the pest. The leaflets could be burnt to reduce the caterpillar/ pupal population.
- Domestic quarantine should be strengthened by not transporting coconut fronds from pest-infested zone to pest free zone.
- Augmentative release of the larval parasitoids viz., *Goniozus nephantidis* (20 parasitoids per palm) and Bracon brevicornis(30 parasitoids per palm) if the pest stages is at third-instar larvae and above. The pre-pupal parasitoid (*Elasmus nephantidis*) and pupal parasitoid (*Brachymeria nosatoi*) are equally effective in pest suppression and are released at the rates of 49% and 32%, respectively for every 100 pre-pupae and pupae estimated.
- Before releasing, the parasitoids are adequately fed with honey and exposed to host odours (gallery volatiles) for enhancing host searching ability.
- Ensure adequate irrigation and recommended application of nutrients for improvement of palm health.

Rugose Spiralling Whitefly *(Aleurodicus rugioperculatus)*

This period could also witness the establishment of the invasive rugose spiralling whitefly (*Aleurodicus rugioperculatus*) in new areas as well as re-emergence in already reported areas. Presence of whitefly colonies on the lower surface of palm leaflets and appearance of black coloured sooty mould deposits on the upper surface of palm leaflets are characteristic visual symptoms of pest attack. In severe cases, advancement in senescence and drying of old leaflets was observed. Leaflets, petioles and nuts were also attacked by the whitefly pest and a wide array of host plants including banana, bird of paradise, Heliconia sp. were also reported.

▶ *Management*

- In juvenile palms, spraying of water with jet speed could dislodge the whitefly and reduce the feeding as well as breeding potential of the pest.
- Ensure good nutrition and adequate watering to improve the health of juvenile and adult palms
- No insecticide should be used as this causes resurgence of the pest and complete kill of the natural aphelinid parasitoid, *Encarsia guadeloupae.* A pesticide holiday approach is advocated for the build up of the parasitoid.
- Installation of yellow sticky traps and conservatory biological control using *E. guadeloupae* could reduce the pest incidence by 70% and enhance parasitism by 80%.
- Habitat preservation of the sooty mould scavenger beetle, *Leiochrinus nilgirianus* could eat away all the sooty moulds deposited on palm leaflets and cleanse them reviving the photosynthetic efficiency of palms.
- A close scrutiny should be made for the presence of other whiteflies including the nesting whiteflies on coconut system.

Rugose spiralling whitefly Parasitized pupae

Encarsia guadeloupae

Sooty mould scavenger beetle

Nesting whiteflies (Paraleyrodes bondari and Paraleyrodes minei)

In addition to the rugose spiralling whitefly, two more nesting whiteflies (*Paraleyrodes bondari and Paraleyrodes minei*) are found associated with palm leaflets. Nesting whiteflies are smaller in size (1.1 mm) than rugose spiralling whitefly (2.5 mm). The nymphs are flatter with fibreglass like strands emerging form dorsum whereas the nymphs of rugose spiralling whitefly are convex in shape. Adult nesting whiteflies construct bird's nest like brooding chamber and sustains in the chamber. *P. bondari* had

P. bondari

P minei

Cybocephalus sp.

X-shaped oblique black marking on wings with two minute projections on rod shaped male genitalia whereas *P.minei* is devoid of black markings on wings and possesses cock-head like genitalia.

▶ *Management*

- In juvenile palms, spraying of water with jet speed could dislodge the whitefly and reduce the feeding as well as breeding potential of the pest.
- Ensure good nutrition and adequate watering to improve the health of juvenile and adult palms
- Effective nitidulid predators belonging to *Cybocephalus sp.* were observed on the palm system and pesticide holiday is advised for conservation biological control.

Disease

Leaf blight of coconut *(Lasiodiplodia theobromae)*

Leaf blight is an emerging disease in Coimbatore, Erode, Dindigul, Tirunelveli and Kanyakumari districts of Tamil Nadu. The pathogen causes damage in leaf and nuts. Affected leaflets start drying from the tip downwards and exhibit a charred or burnt appearance. The leaves in lower 3 to 4 whorls are affected. Leaf blight causes apical necrosis of lower leaves with an inverted "V" shape, and symptoms similar to those induced by drought (water deficit) and other stresses. The leaflets have extensive necrotic lesions with defined edges and without transition areas between the necrotic and healthy tissues. The pathogen can internally colonize the rachis, inducing internal necrosis that moves upward towards the stem (systemic invasion). The necrotic tissues develop exposed cracks that release gums under the leaf rachis and at petiole insertion. On coconuts, small black sunken region appear near the perianth of immature nuts.When nearly mature /mature nuts were infected, the infection spread internally into mesocarp without any external symptoms. The affected nuts are desiccated, shrunk, deformed and drop prematurely causing 10% to 25 % loss in nut yield.

▶ *Management*

- Improving the palm health by application of 5 kg neem cake enriched with Trichoderma harzianum and soil test based nutrition.
- Adequate irrigation and adoption of soil and water conservation measures is advised.
- Root feeding of hexaconazole @ 2% (100 ml solution per palm) thrice a year.

The dynamics of insect pests and diseases in coconut system vis-à-vis weather change pattern is so critical in population build up. Timely prophylactic measures to safeguard palms and enhancing palm health through need-based nutrition is very essential to withstand the pressure exerted by pests and diseases in outbreak situation. ■

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

Market review – February 2019

Domestic price

Coconut Oil

During February 2019 the price of coconut oil opened at Rs.17900 per quintal at Kochi and Alappuzha market and Rs.18250 per quintal at Kozhikode market. During the month, price of coconut oil at all three markets expressed an erratic trend.

The price of coconut oil closed at Rs.17300 per quintal at Kochi and Alappuzha market and Rs.17800 per quintal at Kozhikode market with a net loss of Rs.600 per quintal at Kochi and Alappuzha market and Rs.450 per quintal at Kozhikode market.

The price of coconut oil at Kangayam market in Tamilnadu, which opened at Rs.15333 per quintal, expressed a downward trend and closed at Rs.13667 per quintal with a net loss of Rs.1667 per quintal.

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

	Kochi	Alappuzha	Kozhikode	Kangayam
01.02.2019	17900	17900	18250	15333
10.02.2019	17200	17200	17750	14333
17.02.2019	17700	17700	18200	14267
24.02.2019	17300	17300	17750	13667
28.02.2019	17300	17300	17800	13667

Milling copra

During the month, the price of milling copra opened at Rs.11800 per quintal at Kochi, Rs.11650 per quintal at Alappuzha market and Rs.11600 per quintal at Kozhikode market. The price of milling copra at all three markets expressed an erratic trend during the month.

The prices closed at Rs.11200 at Kochi market, Rs.11100 at Alappuzha and Rs.11200 at Kozhikode markets with a net loss of Rs.600 per quintal at Kochi, Rs.550 per quintal at Alappuzha market and Rs.400 per quintal at Kozhikode market.

At Kangayam market in Tamilnadu, the prices opened at Rs. 10800 per quintal and closed at Rs.10000 per quintal with a net loss of Rs.800 per quintal.

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

	Kochi	Alappuzha (Rasi Copra)	Kozhikode	Kan-gayam
01.02.2019	11800	11650	11600	10800
10.02.2019	11300	11100	11200	10300
17.02.2019	11600	11450	11600	10500
24.02.2019	11200	11100	11150	10000
28.02.2019	11200	11100	11200	10000

Edible copra

The price of Rajapur copra at Kozhikode market which opened at Rs. 15000 per quintal expressed a fluctuating trend during the month and closed at Rs.15600 per quintal with a net gain of Rs.600 per quintal.

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

01.02.2019	15000
10.02.2019	15800
17.02.2019	16600
24.02.2019	15500
28.02.2019	15600

Ball copra

The price of ball copra at Tiptur market which opened at Rs.16300 per quintal expressed an overall upward trend during the month and closed at Rs.16500 per quintal with a net gain of Rs.200 per quintal.

Weekly price of Ball copra at major markets in Karnataka (Rs/Quintal)

01.02.2019	16300
10.02.2019	15600
17.02.2019	16100
24.02.2019	16200
28.02.2019	16500

Dry coconut

At Kozhikode market, the price of dry coconut which opened at Rs.8100 per quintal expressed a downward trend during the month and closed at Rs.7300 per quintal with a net loss of Rs.800 per quintal.

Weekly price of Dry Coconut at Kozhikode market (Rs/Quintal)	
01.02.2019	8100
10.02.2019	7900
17.02.2019	7900
24.02.2019	7300
28.02.2019	7300

Coconut

At Nedumangad market the price of partially dehusked coconut opened at Rs.18000 per thousand nuts and closed at the same price during the month. At Pollachi market in Tamil Nadu, the price of coconut opened at Rs.15000 per thousand nuts and closed at Rs.14000 per thousand nuts. At Bangalore APMC, the price of partially dehusked coconut opened at Rs. 13500 and closed at Rs.15000 per thousand nuts.

Weekly price of coconut at major markets (Rs /1000 coconuts)			
	Nedumangad	Pollachi	Banglore
01.02.2019	18000	15000	13500
10.02.2019	19000	14000	13500
17.02.2019	18000	14000	15000
24.02.2019	18000	14000	15000
28.02.2019	18000	14000	15000

International price

Coconut oil

The international price of coconut oil and domestic price of coconut oil in Philippines, Indonesia and Srilanka expressed a mixed trend during the month, whereas the domestic price of coconut oil in India expressed a slight 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	Sri lanka	India*
02.02.2019	721	730	709	1844	2059
09.02.2019	719	730	713	1802	2059
16.02.2019	666	692	666	1788	2012
23.02.2019	729	700	699	1808	1966
				* Kangayam	

Copra

The domestic price of copra at Philippines, Srilanka and India expressed a mixed trend during the month whereas price of copra in Indonesia expressed a downward trend. 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*
02.02.2019	441	430	996	1474
09.02.2019	436	430	1004	1460
16.02.2019	410	417	996	1418
23.02.2019	412	413	992	1460
				* 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*
02.02.2019	124	138	167	421
09.02.2019	119	143	169	421
16.02.2019	118	141	168	421
23.02.2019	118	142	178	414
				*Pollachi market