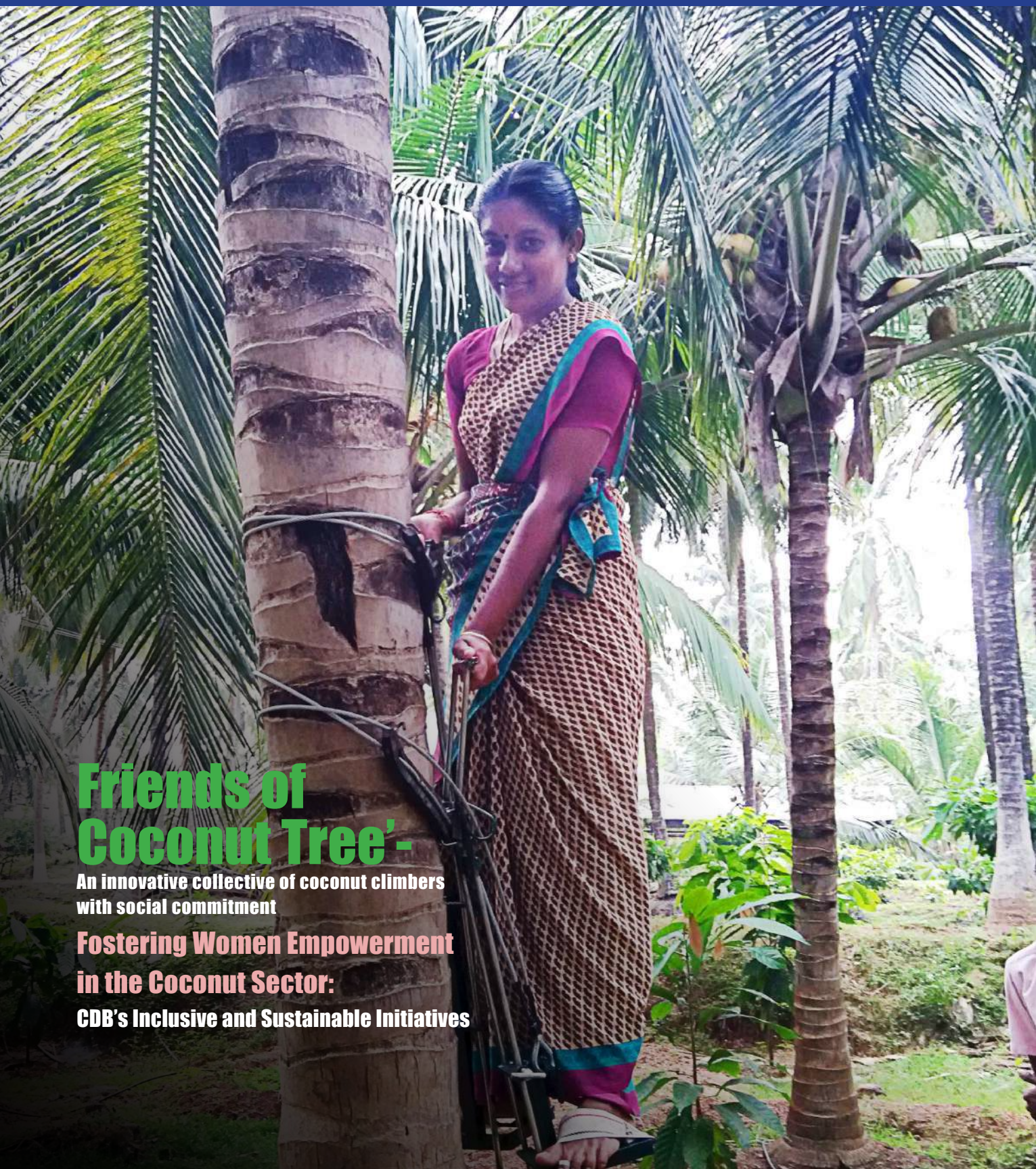
Vol.LXVI No. 07 January- 2024 Pages-40 Price: Rs.6

Indian Coconut Journal



Friends of Coconut Tree' -

An innovative collective of coconut climbers with social commitment

Fostering Women Empowerment in the Coconut Sector:

CDB's Inclusive and Sustainable Initiatives

INDIAN
COCONUT
JOURNAL
Vol. LXVI No.07
January- 2024
Kochi - 11

Publisher
COCONUT DEVELOPMENT BOARD
Ministry of Agriculture and Farmer's Welfare,
Department of Agriculture, Government of India
Kera Bhavan, Kochi - 682 011, India

Phone	:	0484- 2377266, 2377267, 2376553, 2375216, 2376265
Fax	:	91 - 0484-2377902,
Grams	:	KERABOARD
E-mail	:	kochi.cdb@gov.in
Website	:	www.coconutboard.gov.in

SUBSCRIPTION

Annual	Rs. 60.00
Single Copy	Rs. 6.00
Institutes / Libraries	
Annual	Rs. 200.00
Single Copy	Rs. 20.00

Articles, research papers and letters on different aspects of coconut cultivation and industry are invited for publication in this Journal. All accepted material will be paid for. The Board does not accept responsibility for views expressed by contributors in this Journal. All remittances and correspondence should be addressed to the Chairman, Coconut Development Board, Kochi - 682 011.

Coconut Development Board

The Coconut Development Board is a statutory body established by the Government of India for the integrated development of coconut cultivation and industry in the country. The Board which came into existence on 12th January, 1981, functions under the administrative control of the Ministry of Agriculture and Farmers Welfare, Government of India, with its headquarters at Kochi in Kerala State and Regional Offices at Bangalore, Chennai, Guwahati and Patna. There are six State Centres situated in the states of Orissa, West Bengal, Maharashtra, Andhra Pradesh, Gujrat and in the Union Territory of Andaman & Nicobar Islands. DSP Farms are located at Neriyamangalam (Kerala), Vegiwada (Andhra Pradesh), Kondagaon (Chhattisgarh), Madehpura (Bihar), Abhayapuri (Assam), Pitapalli (Orissa), Mandya (Karnataka), Palghar (Maharashtra), Dhali (Tamil Nadu), South Hichachara (Tripura) and Fulia (West Bengal) besides a Market Development cum Information Centre at Delhi. The Board has set up a Technology Development Centre at Vazhakulam near Aluva in Kerala.

Functions

❒ Adopting measures for the development of coconut industry. ❒ Recommending measures for improving marketing of coconut and its products. ❒ Imparting technical advice to those engaged in coconut cultivation and industry. ❒ Providing financial and other assistance for expansion of area under coconut. ❒ Encouraging adoption of modern technologies for processing of coconut and its products. ❒ Adopting measures to get incentive prices for coconut and its products. ❒ Recommending measures for regulating imports and exports of coconut and its products. ❒ Fixing grades, specifications and standards for coconut and its products. ❒ Financing suitable schemes to increase the production of coconut and to improve the quality and yield of coconut.

❒ Assisting, encouraging, promoting and financing agricultural, technological, industrial or economic research on coconut and its products. ❒ Financing suitable schemes where coconut is grown on large scale so as to increase the production of coconut and to improve its quality and yield and for this purpose evolving schemes for award of prizes or grant of incentives to growers of coconut and the manufacturers of its products and for providing marketing facilities for coconut and its products. ❒ Collecting statistics on production, processing and marketing of coconut and its products and publishing them. ❒ Undertaking publicity activities and publishing books and periodicals on coconut and its products.

The development programmes implemented by the Board under the project Integrated Development of Coconut Industry in India are- production and distribution of planting material, expansion of area under coconut, integrated farming for productivity improvement, technology demonstration, market promotion and Information and Information Technology. Under the Technology Mission on Coconut, the programmes implemented by the Board are development, demonstration and adoption of technologies for management of insect pest and disease affected coconut gardens, development and adoption of technologies for processing and product diversification and market research and promotion.

Index

Dear friends,

As we enter into another promising year, it is both an honor and a pleasure to extend warmest greetings to all esteemed readers of the Indian Coconut Journal.

During 2023, Coconut Development Board through its relentless efforts could significantly contribute to the growth and sustenance of the coconut industry in the country. From the promotion of sustainable agricultural practices to the promotion of innovative technologies, Board has been at the forefront in bringing in positive changes. For intensifying the research and development initiatives, Board has been actively supporting and promoting research endeavors aimed at addressing the challenges faced by coconut farmers. Research outcomes have not only enhanced crop productivity but also contributed to the development of better and more efficient pest and disease management ensuring the longevity and prosperity of coconut cultivation.

The Board's commitment to strengthening the coconut sector by extending financial assistance for setting up coconut based industries under the Technology Mission on Coconut programme has fostered collaborations with research institutions, industry stakeholders, and government bodies to create a holistic ecosystem for coconut development. This collaborative approach has accelerated the pace of innovation and knowledge exchange, ensuring a sustainable trajectory for the coconut industry.

In the realm of technological advancements, Coconut Development Board is committed in integrating modern technologies into coconut farming practices. The promotion of precision farming, natural farming, the use of drones for crop monitoring, and the application of smart irrigation systems are the few projects in the pipeline through which technologies will be harnessed to enhance efficiency and productivity in coconut cultivation.

Board through extensive training and awareness campaigns, could empower the farmers across the nation with the necessary knowledge and tools to adopt integrated, agro ecological and sustainable approaches. Concerted efforts are also being made to address social and economic aspects through various skill development initiatives, and empowerment projects alongwith insurance schemes to uplift the livelihood of coconut farmers and their communities.

Board is aware that many challenges persist in the sector while many new opportunities are in the waiting. One of the key focus areas for the coming year is to further strengthen the research and development initiatives. The Board aims to intensify efforts in collaborating with research institutions, agricultural universities, and industry stakeholders to delve deeper into issues such as disease management, pest control, and the development of coconut varieties that are not only high-yielding but also resistant to environmental stresses.

In alignment with the global commitment to sustainable development, the Board envisions the expansion of eco-friendly practices like organic and natural farming, exploring renewable energy solutions, and implementing circular economy principles to minimize waste and maximize resource efficiency within the coconut value chain.

The Indian Coconut Journal will remain dedicated to serving as a conduit for information exchange, knowledge dissemination, and fostering a sense of community within the coconut sector. Together, let us stride forward into 2024 with renewed vigor, equipped by the lessons of the past and guided by the vision of a sustainable, resilient, and prosperous coconut sector.

Chairman,
Editorial Board

Friends of Coconut Tree'-

an innovative collective of coconut climbers with social commitment

Thamban C. and S. Leena

Principal Scientist, ICAR-Central Plantation Crops Research Institute, Kasaragod
and Chief Technical Officer (retd.) Krishi Vigyan Kendra, Kasaragod

Background

Coconut growers experience various constraints to make farming a sustainable and economically viable enterprise. Lack of availability of labour, especially skilled labour for coconut climbing, and high wage rate are among the important problems faced by them to adopt timely crop management practices. 'Friends of Coconut Tree' (FoCT) scheme, an innovative capacity building initiative being implemented by Coconut Development Board since the year 2011 to develop a professional group of youth for harvesting and plant protection operations in coconut thus assumes much relevance and significance.

The FoCT programme was started in the year 2011 with the objective to identify, train and handhold at least 5000 under employed youth covering 10 major coconut growing districts of the state of Kerala. In the first phase itself *ie*, in 2011, the programme was a huge success eliciting tremendous response from the youth and a total of 5604 youth were trained thus exceeding the target. The beneficial impact of FoCT initiative prompted coconut farmers and their collectives from various parts of the country to approach CDB requesting to extend the scheme to their localities as well. Rest is history; started as a scheme for only one year duration (2011-12) with a target to train 5,000 youths covering only Kerala state, the FoCT initiative has been continued since then uninterrupted empowering 66,874 youths across 15 states and three union territories during the last 13 years ie from 2011 to 2023. Kerala state

Sl.No.	State/Union Territory	No. of youths trained
1	Kerala	32926
2	Tamil Nadu & Pondichery	10416
3	Karnataka	7243
4	West bengal	6668
5	Maharashtra	1467
6	Andhra Pradesh	2489
7	Odisha	1800
8	Assam & Nagaland	1698
9	Tripura	117
10	Gujarat	296
11	Chattisgarh	596
12	Madhya Pradesh	40
13	Goa	557
14	Lakshadweep	161
15	Bihar	360
16	Andaman & Nicobar	40
	Total	**66874**

Table 1. Coverage of 'Friends of Coconut Tree' scheme during the period from 2011 to 2023

Source: Coconut Development Board, Kochi

leads with 32,926 trained youths followed by Tamil Nadu, Karnataka, West Bengal and Maharashtra (table 1).

Besides imparting skill training for climbing palms using mechanical climbing device, the training targeted the group of unemployed youth for developing technical skills to carry out various crop management practices including plant protection measures, entrepreneurship capacity, leadership qualities and communication skills to address the needs of the coconut growers.

Experiences from the field across the coconut growing states indicate that FoCT programme has been hugely successful in achieving the desired results. A substantial number of the trained youth render their service to the coconut growers on a regular basis which also paved way for the socio-economic empowerment of palm climbers.

An innovative collective of Friends of Coconut Tree

Trained youths under FoCT in Kasaragod district of Kerala state have organised themselves into a collective to streamline their activities in a systematic and effective manner in line with the objectives originally envisaged under the FoCT. It is a novel initiative which can be a model to be replicated in other coconut growing tracts as well and can contribute for the sustainable development of the coconut sector.

About 1000 rural youths were trained in batches of 20 each under the FoCT scheme in Kasaragod district at Krishi Vigyan Kendra functioning under the ICAR-Central Plantation Crops Research Institute during the year 2011-12. Though such a substantial number of youths were trained to support coconut growers in the district, the routinely raised concern by the growers on lack of availability of palm climbers persisted even after 10 years of completion of training interventions under FoCT scheme which prompted a few youths trained under FoCTs to think about the necessity to form an organisation to address the problem experienced by coconut growers and ensure quality service in a regular manner. Collecting the contact details of youths trained under FoCT was a difficult task in the beginning.

Initially a whatsapp group of 32 like minded FoCT youths was formed and started discussions online about the formation of a collective. Subsequently on 16th October 2021 the meeting attended by 50 FoCTs was conducted at Kuttikol which was inaugurated by Mr. Murali Payyanganam, President, Kuttikol grama panchayat. In the meeting it was decided to form a collective of youths trained under FoCT scheme and an executive committee with 15 members was constituted with Mr. K. T. Sukumaran as Patron, Mr. Mani C.H., as President, Mr. Binu Balal as Secretary, Mr. Mohanan Kalakkara as Joint Secretary and Mr.

Surendran Pookkayam as Treasurer. The organization was formally named as 'Kasaragod Jilla Thenginte Changathikoottam' (Kasaragod District Friends of Coconut Tree). Then the collective was registered under the Charitable Societies Act in the year 2022 with register number KSR/CA/189/2022.

The basic objectives of the society is to undertake various activities for the welfare of the families of its members and their socio-cultural and economic development and to ensure better service to farmers. provide financial support to members who suffer due to accidents while climbing palms and do the needful to make available to them incentives from the concerned agencies, ensure health insurance coverage to the members, arrange skill training programmes for unemployed youth, promote farming activities by the members to enhance their income and arrange training on scientific cultivation practices, encourage activities for blood donation, eye donation etc by the members, take initiative to establish recreations centres, libraries, co-operative ventures etc to benefit the members and their families, extend support to members during their difficult times such as illness, old age, death, unemployment etc, provide support for the educational needs of the children of its members, organize excursion to selected locations, encourage

participation of members in the family functions such as marriages and extend necessary support for the smooth conduct of such functions etc.

Present status and activities

Currently there are 300 members including 12 women spread over 11 grama panchayats in Kasaragod district; number of members ranging from 13 to 50 per grama panchayat. To carry out various activities, unit committees have been formed in these 11 grama panchayats. The activities of the society are managed by an executive committee having 21 members with Mr. Mani C. H. Kuttikol as president and Binu Balal as secretary. The executive committee regularly meets and review the progress of implementation of planned activities.

Facilitating insurance coverage for coconut climbers

An important activity of the society is to create awareness and to facilitate insurance coverage for the palm climbers. More than 90% of the members are now covered under insurance scheme 'Kera suraksha' programme implemented by the Coconut Development Board.

Support for medical treatment

The society takes prompt action to financially support its members who fell ill due to accidents while climbing palms. On receiving information about the accident to any member the executive committee convene its meeting and decide the amount of financial support to be provided considering the need and ensure the disbursement of sanctioned amount to the family the very next day. About 25 members have been supported like this during the last two and a half years of society functioning and an amount of Rs 2,35,000/- have been spent for the same. Fund mobilization for the medical treatment aid is done mainly through the donation of one day's wage by the society members. Another unique mode of resource mobilization was done through the 'Dhothi challenge' taken up by members in which each of them made efforts to 'sell dhothis' and the margin amount realized was donated to the medical treatment support fund. Besides, membership fee collected @Rs 500/- is also being utilized for supporting the needy members for medical treatment.

Charity and social work

The society is organizing different activities as part of charity and social commitment. A unique intervention of the society is worth mentioning in this context. In the facebook page of the society a message was posted by a coconut farmer from Vellarikundu, a village in the eastern hilly terrain of Kasaragod district, sharing his concern that he is

really struggling to harvest his coconut palms since many months because of the shortage of climbers. The society took it as an opportunity and organized a 'coconut climbing challenge' and mobilized nearly 100 of its members on 4th February 2023 and reached the coconut orchard and completed the harvesting of all palms within an hour. Meanwhile two other coconut growers from the nearby locality also came to the orchard knowing the gathering of climbers there and requested to help them also for the harvest of coconut palms in their orchards. The society members promptly obliged those farmers also. Altogether they climbed about 800 coconut palms and harvested nuts. As a noble gesture from the society, the entire amount of wages for climbing 800 palms thus earned by the team members was donated to the Gandhibhavan Charity Home functioning at Mankayam in the nearby Balal grama panchayat to be spent for the food, medicine and other essential goods needed by the inmates of the charity home. This incident won a lot of appreciation for the society.

Family meet

Organising 'Family Meet' has been another regular activity of the society since its inception. The objective of conducting the meet is to strengthen fraternity and co-operation among members from different localities of the district. The meet also provides a platform for the members and their family to exhibit their talents including music, dance and other art forms. The first family meet of the society members was organized at Bekal Fort. Second family meet was conducted at Poliyamthuruth Eco-tourism Village on 3rd December 2023 which was inaugurated by Dr Thamban C, Principal Scientist, ICAR-CPCRI Kasaragod. Mr. Siji Mathew, President of Karadka block panchayat was the chief guest. Mr. Mani C.H. president of the society presided over the inaugural function. Mrs. M. Dhanya, president of Bedadka grama panchayat and Mrs. P.V. Mini president of Muliyar grama panchayat and Mr. K.T.Sukumaran offered felicitations. Mr. Binu Balal, secretary welcomed the gathering and Mr. Satheesan Kuttippuram proposed vote of thanks. During the meet Mr. Harijith Choorithode an award winning dairy farmer, Mr. Sreekumar Karivedakam a young 'Theyyam' artist and Mr. Chandran Pakkam an athlete were honored. Besides, children of the society members who passed SSLC and Plus-two examinations during last year were felicitated. Afternoon session of the family meet was set apart for variety entertainment programme presented by members and their families.

Future endeavours

The society is very keen to formulate interventions to deploy the skilled manpower of its members in a systematic manner for the benefit of coconut growers of the district and for the sustainable development of coconut sector. One of the interventions being mooted is the formation of labour banks. It is proposed to establish labour banks with the available members of the society in one or two grama panchayats of Kasaragod district where the units of the society are active. Through the labour bank the service of the skilled manpower of unit members will be effectively made available for the

coconut growers of the concerned grama panchayat. An action plan for a year taking into account the coconut farming situation in the locality will be prepared. The action plan would be prepared in consultation with the coconut growers of the locality who would be the other active stakeholder category considering the requirement of skilled manpower for harvesting, crown cleaning, pest and disease management and other crop management practices. The participation of coconut farmers in the labour bank would be through Coconut Producers Societies (CPSs) or the coconut growers' collective facilitated under 'Keragramam' scheme of the Department of Agriculture wherever feasible. The society would do the needful to ensure cooperation between coconut growers and the society members in the selected grama panchayat so that the members can serve the farmers better. The extent and quality of service expected by the farmers and wages to be paid for the service of members of the society of the locality would be discussed in the 'Coconut farmer - 'Friends of Coconut Tree' interface programme. The involvement of the representatives of the local self government and Agricultural officer of the local Krishibhavan would also be ensured to make the interface programme effective. Other activities planned to be taken up in future by the society include organising units in every grama panchayats of the district with maximum enrollment of climbers, forming block level committees once units are established in all grama panchayats, facilitating formulation of interventions under the decentralized planning initiative by local self governments to benefit palm climbers, providing need based financial support to the climbers who suffer due to accidents while palm climbing, organizing charity work and rendering voluntary services to benefit the general public and above all to implement interventions to motivate the members to make themselves available to serve coconut growers at a phone call.

55th Sree Ramakrishna Mela

CDB, State Centre, West Bengal participated in the 55th Sree Ramakrishna Mela and Exhibition held from 18th to 21st January 2024 at Narendrapur RKM ashram, South 24 Parganas district. Board displayed various informative posters on Board's schemes and on the goodness of coconut and publications of the Board. Display of various value added products viz virgin coconut oil, tender coconut water, coconut oil, handicraft items, different varieties of coconut seedlings etc were arranged in CDB's stall.

Agri vision

CDB, State Centre , Odisha participated in the Agri vision exhibition held from 19th to 21st January 2024 at ICAR-NRRI, Cuttack. Board displayed various informative posters on Board's schemes and on the goodness of coconut and publications of the Board. Display of various value added products like virgin coconut oil, coconut chips, neera, tender coconut water, coconut oil and handicraft items were made in CDB's stall.

Significance of Microbiological Quality Testing in Coconut Processing Sector

Sumi S. Nair Microbiologist**, Meera Chandran M.T** Technical Officer and **Resmi D.S.** Deputy Director
CDB Institute of Technology, South Vazhakulam, Aluva, Kerala

Coconut Development Board has established a Quality testing laboratory (QTL) at South Vazhakulam, Aluva, Kerala. QTL is accredited by the National Accreditation Board for Testing and Calibration Laboratories (NABL) as per ISO/IEC 17025:2017." NABL-accredited laboratories in India follow the same guidelines as accredited laboratories in other parts of the world. It is especially valuable for international recognition and mutual acceptance of test results, and have worldwide acceptance. As there is a global demand for coconut products, quality testing enhances the confidence of the exporters and there would be savings in terms of time and money due to reduction or elimination of the need for re-testing of products in other countries.

CDB's Microbiology lab mainly focuses on quality testing of coconut products and water used in the coconut processing industry and fruits and vegetable products. The lab is well equipped for biological testing of food products.

Quality testing of edible coconut products is essential to ensure that the product is safe from physical, chemical and biological hazards. The advantages of testing include supporting consumer transparency and adhering to food safety regulations. Microbiology testing is necessary for the food industry for several reasons, including meeting regulatory requirements, evaluating product quality & shelf life and safekeeping of the food ecosystem.

Microbiology lab has facilities for analyzing most of the coconut based products namely; Coconut oil / Virgin coconut oil, Desiccated coconut powder, Coconut milk, Coconut milk powder, Roasted coconut, Chutney powder, Coconut flour, Copra, Grated coconut, Coconut flakes, Coconut slice, Coconut cream, Coconut paste, coconut based ready to cook products, Coconut based curry mix, Coconut cookies, Coconut chips, Coconut chocolate, Tender coconut water, Matured coconut water, Neera and Neera products, Coconut based soft drinks, Coconut Vinegar, Nata de coco, etc.

Bacterial and fungal contaminations in food production is associated with various food borne illnesses with symptoms ranging from mild nausea to severe gastrointestinal poisoning and death. Food spoilage, often recognized by the degradation of texture, flavors or nutritional value, can be caused by bacteria, yeast and mold. Hence it is necessary to ensure the food safety through laboratory testing.

Biological testing is conducted according to the National and International standard procedures such as USFDA BAM and BIS. QTL offer Qualitative and Quantitative estimation of pathogen testing. Generally are provided by QTL testing for the following Microbiology parameters;

- Total plate count
- Yeast and Mold
- Total coliforms
- *Escherichia coli*
- *Salmonella*
- *Staphylococcus aureus*
- *Bacillus cereus*
- Enterobacteriacea

Any exporter/ entrepreneur can directly submit a sample in the lab or send by courier for testing. It is mandatory that minimum 200 gm or 200 ml sample has to be provided for testing any parameter.

The testing fee details of various microbial parameters are detailed below:

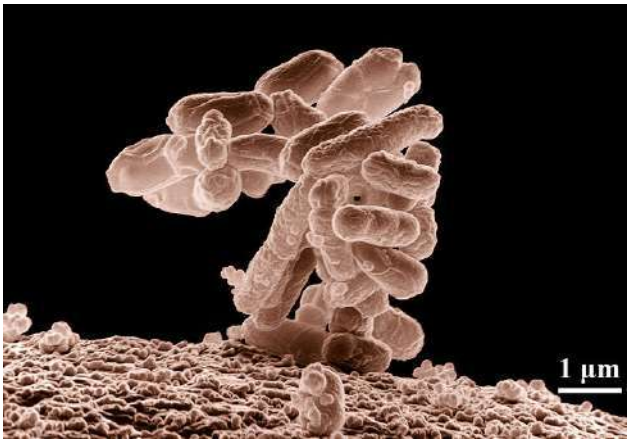
S. No	Parameters	Analytical Fee per sample (Rs.)
1	Total plate count	500
2	Enterobacteriacea	450
3	Total coliforms	450
4	Salmonella	1500
5	Staphylococcus aureus	800
6	Yeast and Mold	400
7	E. coli	800
8	Sulphite reducing clostridia	700
9	Bacillus cereus	800
10	Anti-microbial activity	550

A method of determining the number of viable bacteria in a food sample test is essential in assessing the safety and quality of coconut products, as high levels of bacteria indicate poor hygiene or inadequate processing conditions.

Both yeasts and molds cause various degrees of deterioration and decomposition of foods. These organisms infest coconut products due to their relatively versatile environmental requirements. They also grow on processed foods and food mixtures and may produce abnormal flavors and odors. Several food borne molds, and possibly yeasts, may also be hazardous to human or animal health because of their ability to produce toxic metabolites known as mycotoxins (toxins produced by fungus). Contamination of foods by yeasts and molds can result in substantial economic losses to producer, processor, and consumer.

Coliform, *Escherichia coli* is an indicator of unsanitary conditions or poor hygiene practices during or after food production. High levels of coliforms in coconut food products indicate poor sanitation during the preparation or processing. High coliform levels in food products can cause food poisoning and intestinal infections. Most *Escherichia coli (E.coli)* are harmless, but some strains can cause serious food poisoning diseases.

Raw, unprocessed coconut supports the growth of *salmonella spp.* Food and Drug administration (FDA) has reported Salmonella outbreak in dried coconut samples. FDA listed six pathogens as the "Big 6," & *Samonella* and *E.coli* are included in this category. An effective control measure used to minimise *Salmonella spp* is pasteurisation/retorting of raw coconut meat. Good manufacturing and good hygienic practices will minimise post-processing contamination.



Low-temperature electron micrograph of a cluster of E. coli bacteria, magnified 10,000 times. Each individual bacterium is oblong shaped.

Staphylococcus aureus will get into food from food handlers or from unclean food preparation surfaces. It has the ability to produce several entero toxins that are responsible for food poisoning. The temperature range for the bacterium to form toxin is from 10°C to 45°C. Hence the normal refrigeration temperature can restrict the formation of toxin.

Bacillus cereus is a foodborne pathogen that can produce toxins, causing two types of gastrointestinal illness: the emetic (vomiting) syndrome and the diarrhoeal syndrome. One of the easiest ways to prevent foodborne illness associated with B. cereus is by ensuring that foods are cooked thoroughly and cooled rapidly. One of the leading causes of foodborne infections and intoxications by *B. cereus* is the improper holding of cooked foods.

Due to changing food habits of people and urbanization, processed and ready to eat food items are being manufactured on large scale. Hence to ensure the regulatory standards as well as to guarantee consumer safety and quality, Microbiology testing of Coconut products is recommended as an essential step. It helps to improve the quality and shelf life of the products and also identify and prevent the spread of harmful microorganisms that can cause food borne illnesses.

During processing, possibility of the food substances to be in contact with various microorganisms is very high. While many of these microbes are harmless, others have the potential to contaminate food products and harm consumer's health. The role of microbiological testing is to

identify these microorganisms and prevent them from reaching the consumer. Overall, microbiological quality testing is essential in the coconut processing sector to ensure the safety, quality, and compliance of coconut products with regulatory standards. It helps in protecting public health and maintaining consumer confidence in the industry.

QTL also provide guidance for setting up of Microbiology lab in coconut processing unit as per FSSAI Standard. QR also offer Internship facilities and academic project guidance to under graduate and post graduate Microbiology and Food Technology students. An exclusive training on Microbiological quality evaluation of coconut products for 2 weeks is also offered for analyst working in the coconut processing industry.

QTL encourage and support coconut processing units and upcoming entrepreneurs to deliver safe and quality product in market through testing. CDB QTL is assured to continually improve quality system to fulfil coconut manufacturers expectations.

For more details contact : Quality testing lab, Keenpuram, Aluva-Kerala- 683105, Phone : 0484 2679680

email :- cit-aluva@coconutboard.gov.in

Fostering Women Empowerment in the Coconut Sector:

CDB's Inclusive and Sustainable Initiatives

Sona John
Publicity Officer, Coconut Development Board, Kochi

Introduction:

The Coconut Development Board (CDB), functioning under the Ministry of Agriculture and Farmers Welfare of the Government of India, plays a pivotal role in sustaining and advancing the coconut sector. This sector not only provides livelihood for millions but also significantly contributes to the nation's economy. CDB's initiatives focus on improving the production and productivity, enhancing product quality, and expanding the market for coconut-based products, while uplifting the socio-economic conditions of those involved in the sector.

Inclusive Development Initiatives

CDB implements various developmental schemes and programs to foster integrated growth iof coconut farming and industry. These encompass planting material production, productivity improvement, value addition, marketing, export, and initiatives for publicity, extension, and skill development. Recognizing the pivotal role of women in agriculture, CDB is committed to empowering women in the coconut sector by extending financial assistance under various schemes, providing training and educational opportunities and by recognizing and promoting excellence in various coconut related fields.

Empowering Women in the Coconut Sector

Recognizing the crucial role women play in agriculture globally and their diverse contributions to food production, family income, and rural development, CDB places a strong emphasis on

empowering women in the coconut industry. To achieve this, the Board provides training and education opportunities, equipping women with knowledge and skills in various aspects of coconut farming, processing, and management. Training programs cover best agricultural practices, modern processing techniques, financial literacy, and leadership skills. Access to credit and financial services is also improved to facilitate women's investment in their coconut businesses, fostering growth and expansion. Additionally, the introduction of modern technology and innovation, such as mechanized coconut processing machines aims to reduce intensive labor burdens and enhance productivity, while also facilitating broader market access for women in the sector.

CDB's Women friendly Initiatives

Understanding the pivotal role of women in coconut cultivation, processing, and marketing, CDB has tailored its many general schemes and programs

to be women-friendly, with a focus to bring in more women along with men into the sector thereby improving the socio-economic status of women engaged in the coconut sector. These initiatives aim to enhance the participation, income, and overall empowerment of women in the coconut industry.

Women friendly Schemes of CDB

i. CDB Institute of Technology

The CDB Institute of Technology is working on development and demonstration of technologies for product diversification and by product utilization of coconut. The Institute extends training to interested entrepreneurs and self help groups for acquiring technologies on post harvest coconut processing and process demonstration. A full fledged Quality Testing Laboratory is functioning at the Institute. The institute has extended training to around 500 women and many of them have successfully established their own units. Interested women entrepreneurs can get in touch with CDB Institute of Technology for attending the training programme.

GreenAura International: Pioneering Excellence in Coconut Processing

Success Story

Founded in 2012 by Sumila Jayaraj, GreenAura International is a dynamic integrated coconut processing unit located in Thrissur, Kerala with 'Greennut' as its distinctive brand name. This enterprise, driven by a profound mission, aims to develop and produce value-added coconut products, support local coconut farmers, and share the goodness of coconut with the global market.

At present, GreenAura International is having an impressive lineup of eight coconut-based products, showcasing Sumila's dedication to quality and variety. The product range includes coconut milk, cold-pressed extra virgin oil, desiccated coconut powder, coconut chutney, coconut water vinegar, hair cream, low-fat desiccated coconut, and coconut pickle. Each product is a testament to the enterprise's commitment to offering diverse options while harnessing the nutritional and culinary benefits of coconuts.

Sumila Jayaraj's pursuit of excellence is evident in her continuous learning and skill development. She underwent specialized training from the Coconut Development Board (CDB) on the manufacturing of Coconut Water Vinegar, showcasing her commitment to staying at the forefront of industry practices. GreenAura International is not just an entrepreneurial venture; it is a significant project with an investment of 1.8 Crores which is catering to the domestic market as well as international market.

ii. Encouraging Technological Advancements

The scheme Technology Mission(TMoC) on Coconut of CDB aims to enhance the productivity of the coconut industry through pest and disease management, processing, product diversification, and marketing. The programme is implemented on project basis for management of insect, pests and affected gardens, processing and product diversification, market research and promotion and technical support, external evaluation and emergent requirements. Under this scheme financial assistance is extended for interested beneficiaries of which more than 10% are women.

Success Story

Breaking Barriers and Building Success: The Inspiring Journey of S. Arunya, Owner of Indian Coconut Products

In the heart of Pollachi, Tamil Nadu, S. Arunya has not only shattered gender stereotypes but has also built a thriving enterprise that has become a trailblazer in the coconut industry. As the proprietor of Indian Coconut Product, a manufacturer specializing in Desiccated Coconut Powder, Arunya's story is one of determination, resilience, and visionary leadership.

Driven by a passion for agriculture and a profound connection to her roots, Arunya envisioned a business that could transform coconuts into valuable products. Thus, Indian Coconut Product was born, located strategically in Pollachi, the prime coconut-producing area, with a remarkable production capacity of 110,000 nuts per day. Looking ahead, Arunya recognizes the importance of maintaining and enhancing product quality and sustainability. Her future plans include introducing new coconut-based products like Virgin Coconut Oil and Coconut Sugar, showcasing the versatility of coconuts and providing a broader array of options for customers. Arunya's journey stands as an inspiring testament to what determination and vision can achieve. As a woman entrepreneur leading a successful Desiccated Coconut business, she embodies empowerment and success, proving that dreams can be realized irrespective of gender. Her story serves as a beacon of inspiration for aspiring women entrepreneurs, emphasizing that with the right mindset and hard work, limitless possibilities can be achieved in the entrepreneurial realm. Indian Coconut Products is assisted by CDB under TMoC

iii. Market Promotion

The Board undertakes market promotion activities for the development of the coconut sector in the country. The major activities are Market Promotion, Market Intelligence, Market Research, Market Development, facilitating Farmers' Collectives. CDB is extending financial assistance to entrepreneurs/ Coconut Producer Companies to participate in domestic trade fairs/ exhibitions, assistance for Quality Certification, infrastructure support for establishment of Procurement Centres by FPOs and setting up of sales outlets or kiosks for value added coconut products.

iv. Promoting Export of coconut products

CDB is notified as the Export Promotion Council (EPC) for all coconut products other than those made from coconut husk and fiber and issues Registration cum Membership Certificate (RCMC) from the Export Promotion Council to enable exporters to avail various benefits under the Foreign Trade Policy. CDB has so far extended 6248 RCMCs to coconut product exporters including many women exporters. CDB is extending assistance to coconut product exporters for participation in International Exhibitions, Trade Fairs, Buyer Seller Meets etc.

v. Recognizing Excellence in Exports

To recognize outstanding efforts in the export of coconut products, CDB instituted the Awards for Excellence in Export Performance. These awards acknowledge the contributions of exporters, including categories such as Best Woman Manufacturer Exporter and Best Woman Merchant Exporter.

Success Story

Sajitha Basheer, A Technocrat and Woman Entrepreneur in the Coconut Industry

Mrs. Sajitha Basheer, a distinguished technocrat and woman entrepreneur, received the esteemed Best Woman Manufacturer Exporter award of Coconut Development Board (CDB). Serving as the Managing Director of Cochin Surfactants Pvt Ltd, a venture promoted by the MFAR Group under the visionary leadership

of Dr. P. Mohamed Ali, Sajitha Basheer has not only excelled in her role but has also made a significant impact in the industry. Cochin Surfactants Private Ltd, incorporated in 2002 as a 100% Export Oriented Unit (EOU) is specializing in the manufacturing and export of Coconut Shell Based Activated Carbon products. Supported by the Coconut Development Board through investment subsidies, CSPL adds substantial value by processing around 20,000 MT of coconut shells annually. This initiative has proven to be a significant boon for coconut farmers, providing them with additional revenue for coconut shells

vi. Skill Development Programmes and Insurance coverage

Under the "Friends of Coconut Tree" training program and skill development programme, CDB imparts training to unemployed youth in coconut harvesting and plant protection operations. The objective is to develop skilled manpower for coconut harvesting and plant protection measures and thereby solve the acute shortage of skilled manpower for coconut harvesting. Trainees are given one week training and are provided with climbing machines free of cost. CDB is also extending Neera Technician training and also in coconut handicraft making. CDB has given training to around 300 women under these training programmes so far.

Success Story

Empowered Excellence

Smt Suni Lee (50), a native of Varkala, Thiruvanathapuram, Kerala attended Board's FoCT training programme in Trivandrum, Kerala in November 2011. Her average monthly income is 35,000/-. She is also working as a master trainer of Friends of Coconut Tree training programme of Coconut Development Board. Smt. Suni Lee is the recipient of the National Award of CDB under best Coconut climbers under FoCT scheme of the Board (Female).

vii. Kera Suraksha Insurance

CDB also facilitates insurance coverage for Coconut Palm and tree climbers, with an emphasis on empowering women climbers through the Kera Suraksha insurance scheme. The Annual Premium under the Kera Suraksha insurance scheme for the climber for an assure sum of Rs. 5,00,000 is Rs. 375 only of which Board will share the 75% of the premium. Board has so far facilitated insurance coverage for around 1000 women under the scheme.

viii. Spreading Awareness for Sustainable Growth

CDB conducts awareness programs nationwide, sensitizing stakeholders in the coconut sector. These programs foster scientific knowledge on coconut cultivation, processing, and value addition, ensuring that advancements reach farmers, particularly women, contributing to sustainable growth. Around 3000 women beneficiaries have attended the programme during the last two financial years.

ix. National Awards

CDB's Scheme of National Awards is to recognize and promote excellence in coconut cultivation, innovative methods in coconut farming, product development, product improvement, quality improvement, product diversification and marketing, export , extension activities, coconut harvesting and Neera Technician. Out of the 11 categories, two awards are reserved exclusively for women viz: The Best Coconut Processing unit managed by women and Climber using traditional methods- Female.

Success Story

Smt Y. Padmavati: A Trailblazing Coconut Farmer from Andhra Pradesh

In the verdant landscapes of Vizianagaram District, Andhra Pradesh, Smt Y. Padmavati, a 62-year-old progressive farmer, has emerged as a beacon of agricultural excellence. Her 14.24-acre farm, scientifically cultivated with 900 East Coast Tall variety coconut palms, stands as a testament to her dedication and innovative farming practices. Notably, she was honored with the prestigious title of Best Coconut Farmer at the National Level in the National Award of the Coconut Development Board (CDB)

Padmavati's commitment to sustainable and efficient farming is reflected in her adoption of integrated crop management practices. A key aspect of her approach is the conservation of essential resources like soil and moisture. Leveraging modern technologies, she has implemented drip irrigation and precise fertilizer application to ensure optimal water management in her plantation. Remarkably, for the past five years, her coconut garden has been maintained exclusively with organic manures, underlining her dedication to environment friendly farming.

x. Integrated Farming for Productivity Improvement

To improve production and productivity of the coconut holdings through an integrated approach and thereby increasing the net income from unit holdings CDB is implementing the scheme 'Laying out of Demonstration Plots'. Under this scheme financial assistance of Rs.35,000/- per ha in two annual installments is extended depending on the activities undertaken in the coconut gardens . Over the last few years, numerous women farmers have also benefited from this scheme.

xi. Replanting and Rejuvenation of Coconut Gardens

Replanting and Rejuvenation of Coconut Gardens is another scheme of CDB for enhancing the productivity and production of coconut by removal of disease advanced, unproductive, old and senile palms, replanting with quality seedlings and rejuvenating the remaining palms through integrated package of practices. The scheme is implemented on project basis based on State specific problems through State Agri./ Hort. Department. Interested women farmers can also avail the benefits of this scheme through their respective state agriculture/ horticulture departments.

xii. Nucleus Coconut Seed Garden

To meet the future demand of quality coconut seedlings, women farmers having suitable land can also establish Nucleus Coconut Seed Garden by availing financial assistance from Coconut Development Board @ 25% of the total expenditure incurred limited to a maximum of Rs.6.00 lakh for maximum of 4 ha over a period of three years. During the last two financial years, CDB has extended the financial assistance to five women for establishing Nucleus Coconut Seed Garden under the scheme.

xii. Small Coconut Nurseries

To encourage private sector and other agencies in seedlings production, CDB is providing financial assistance for establishing coconut nurseries. Financial assistance is limited to 25% of the project cost or Rs.2 lakh, whichever is less, per unit of 0.4 ha with a production capacity of 25,000 certified seedlings per annum. Minimum subsidy of Rs.50,000/ for unit of 0.10 ha with production capacity of 6,250 seedlings per year is also considered. The area requirements and production capacity with respect to North and Northeastern region is 12.5 cents for production of 3125 seedlings with an eligible financial assistance of Rs.25000/- The eligible subsidy is released in two installments. Interested women farmers can also avail this facility for establishing small coconut nurseries. During the last two financial years, CDB has extended financial assistance to 32 women for establishing Small Coconut Nurseries

xiv. Expansion of Area under Coconut

With the objective of increasing the area under coconut cultivation, CDB is extending 'financial assistance to a tune of Rs.6500 to 15000 per ha. depending on variety and location, for planting coconut seedlings in new areas, The subsidy is extended for a maximum of 4 ha per beneficiary, in two equal annual installments. Interested women farmers can avail the financial assistance extended by the Board for bringing in more area under coconut and thereby reap the benefits. During the last three years, 3530 women farmers have availed financial assistance under this scheme.

Conclusion

These initiatives by the Coconut Development Board are instrumental in fostering gender equality, economic empowerment, and sustainable development in the coconut sector. Empowering women not only improves their socio-economic status but also has a positive impact on their families and communities. It ensures that women actively contribute to the growth and vitality of the coconut industry, promoting a more equitable and prosperous sector.

For more details please visit:

www.coconutboard.gov.in

Home Scale Virgin Coconut Oil Production

B. Augustine Jerard*, I Jaisankar, V Damodaran** and S Sumitha***

*ICAR-AICRP on Palms, ICAR-CPCRI, Kasasargod
**ICAR-CIARI, Port Blair

Coconut palm is one of the important plantation crops cultivated in all coastal states, few interior states and North Eastern states in India. The palms are cultivated in plantations in larger areas in addition to lakhs of homesteads for personal consumption and local sale. The coconut palm has multiple uses from roots to leaves and supports many industries such as food, oil, beverages, sugar, coir, biodiesel and handicrafts. Although several uses are reported, coconuts are primarily and traditionally used for production of oil meant for food and industrial purposes. Coconut oil is one of the oldest known edible vegetable oils around the world, but the use of it for food purpose has greatly reduced over the years due to the promotion of other edible oils in different parts of world. In the recent years, coconut oil is again gaining importance and being promoted as one of the healthiest oils due to its high quality and health promoting nature.

The virgin coconut oil (VCO) is preferred over the traditional coconut copra oil by consumers for food, medicinal and cosmetic uses. As everyone knows, generally coconut oil is extracted from the copra made from kernels of mature coconuts. The copra is the dried kernel of coconut. On the other hand, Virgin Coconut Oil differs from the ordinary coconut oil in the way it is extracted from fresh kernels and in terms of its quality and reported health benefits. The term 'virgin' is given to mean oil produced without or very less heat during the process. Virgin coconut oil has a stronger taste and fragrance of fresh coconut and reportedly possesses higher content of antioxidants, protein, vitamins and healthy fatty acids. The VCO is increasing being preferred by people for food and

cosmetic uses. Although many commercial brands and local brands of VCO are available in the market, still large number of coconut oil consumers show apprehensions about the quality of VCO in the market. It is well known that the traditional coconut users in different coconut growing regions have their own methods of extracting oil from the coconut kernel, which they prefer for food and cosmetic purposes at home or community level.

For commercial scale production of VCO, there are standardized technologies available which include direct expelling, centrifuge method or cold pressing, fermentation and hot process method using machineries ranging from coconut dehuskers, shell removers, testa removers, graters, milk expellers or milk squeezers, centrifuge, fermentation tanks, cookers, filters, packing machines and so on. Depending on the capacity of oil production units, these machineries are designed from 100 nuts capacity to thousands of nuts per day. Most VCO producing companies employ one of these methods to get oil extracted from fresh coconut kernel with or without further refinement of oil.

It is always felt that a simple technology in line with traditional coconut oil extraction with available instruments and utensils at home will be helpful to the home makers to produce and meet their own family needs of coconut oil using their own coconuts. Among the methods of VCO production, the fermentation method followed by hot process method is considered as the cheapest and efficient method which could be employed at even lower capacity units with lesser cost. It can be employed even at home kitchen using usual available utensils and tools. In this article, a low-cost, simple methodology for home-scale VCO production at an average Indian home is explained. The methodology could be used even in remote localities with limited facilities and low energy consumption to produce VCO within 20 hours from fresh coconuts with involvement of family labour or as a pass time. The steps including Do's and Don'ts of home scale VCO production are as follows.

Steps

• To produce good quality VCO, freshly fallen or freshly harvested, ungerminated coconuts are to be selected. Care should be taken to avoid the fully dried coconuts without nut water or geminated coconuts as the kernel from these spoiled coconuts may contaminate the mixture giving a bad odour or rancid smell for the resultant oil.

• The fresh, good quality coconuts are to be husked, split into two halves. In case any decay or germination of nuts is noticed at this stage, such nuts should be rejected for VCO production and it could be used for drying to make copra.

• The good white kernels are to be grated and then pressed in a cloth (If the grating appear to be is coarse then it could be further pulverized in a blender/ mixer grinder available at home kitchen) to extract the milk. For grating the kernel, either the traditional tools or electric operated grating machines can be used whichever available.

• The milk is then filtered using double cloth or a fine nylon net. The kernel residue after extraction of milk could be used to feed farm animals which may prefer to eat.

Different layers in the container after fermentation of coconut milk mix

• The filtered milk is then to be measured and diluted with equal quantity of warm water. If any water is added when grinding in the blender that should be taken into account. ('Warm water' can be made by mixing 2 parts of boiling water with 3 parts of normal water). Suppose 500 ml is obtained, it should be diluted with 500 ml of warm water.

• The mixture is to be poured in stainless steel container or good quality plastic container or glass container which should have a wider opening. The wider mouthed vessel is preferred for ease of oil harvest after separation.

• The container is to be covered with a lid and the entire set up is to be kept in a room at warm and dark condition. To make it warm, the containers could be covered with thick clothes or blankets or towels and to be left undisturbed.

• After about 16 to 18 hours, the milk mix will be ready for harvesting VCO.

• Slowly open the lid, there will be four layers in the milk mix. The top layer will usually be very thin containing the floating debris. When carefully removed and discarded, the second layer will be the pure VCO.

• Using a stainless-steel spoon, the pure VCO can be harvested and filled in a bottle or convenient container. While harvesting this second layer, care must be taken to ensure that it does not mix with third layer, which is like curd.

• After maximum possible harvest (without mixing with the curd layer), the left-over oil along with curd (third layer) can be harvested separately and collected. If the curd with little oil is boiled in a thick pan with constant stirring, a highly aromatic hot coconut oil could be obtained which could be useful for cosmetic purpose at home.

• The fourth bottom layer is watery and must be discarded. It could be used for watering the plants at home.

• Coming to the harvested VCO from second layer, the oil may still contain tiny water particles and other debris and hence to be filtered using pure cloth twice. The resultant oil should be clear like water.

• Then the oil could be shifted to a glass container or stainless-steel container and kept in open sunlight for about 8 to 10 hours. This will purify the oil further and remove any residual moisture present in the oil as minute droplets.

• The oil thus obtained could be stored upto 4 months without much problem of rancidity.

• This pure, homemade, edible VCO could be used for family consumption as well as for sale at local markets to the needy people.

Tools, material, manpower and output

The required materials for the home processing of VCO are good quality matured coconuts, a knife to husk and split open the coconuts, coconut grater or scraper, mixer grinder, cloth for pressing and filtering or nylon filter, stainless steel container or plastic bucket, spoon, bottles or stainless-steel container for VCO storage. For hot oil production, a kadai and stove for boiling is required.

A single person/ homemaker can handle about 15 to 20 medium sized coconuts a day for this home scale VCO production using house-hold articles from which about 1.5 litres of VCO could be produced. In addition, about 500 ml of hot processed oil also could be obtained. Depending on the efficiency and skill improvement over time, this could be increased up to 30-40 coconuts a day per person. The oil produced from one day effort using 15 to 20 coconuts may be sufficient for a family of four for a fortnight or month depending on normal usage. The kernel residue after squeezing the milk can be used in food preparations and or as animal feed. The hot oil from curd mixture will usually be more aromatic and preferred for

cosmetic uses. The variety wise VCO recovery from fermentation of milk is as follows.

VCO recovery from different cultivars

Studies conducted at ICAR-CIARI Port Blair with over 30 different coconut accessions and cultivars using this simple method revealed that different cultivars vary over final yield of oil, recovery of VCO from milk, amount of hot oil clarity of oil etc. VCO was recovered from milk extracted from good quality 11 to 12-month-old coconuts from all the accessions using fermentation method at room temperature. Fresh kernel was grated using coconut grater; pulverized using a mixer grinder and the milk was squeezed out using nylon cloth. Milk and water mix at 1:1 ratio was fermented exactly for 18 hours and the VCO was harvested using spoon manually. Among the tall accessions from Pacific Ocean collections Acc 17 recorded highest VCO recovery of 38% of kernel weight followed by Acc 4 (36.1%) and Acc 13 (34.7%). Higher recovery of VCO was also recorded in the accessions 1, 2 and 28 with about 30% recovery based on fresh kernel weight. Among all the dwarf accessions, Acc 18 has recorded the highest VCO recovery of 34.7%. The evaluation revealed wide variation for fruit component traits and the VCO recovery over different cultivars and varieties.

Other traditional methods

The above described fermentation method is generally practiced by local people across different coconut growing regions of the world with slight modifications as per the local conditions. They differ slightly in the selection and handling of fruits from selected coconut varieties, grating size, milk extraction methods, use of location-specific containers, use of herbs or portion of haustorium or matured or tender coconut water as additives in the milk mix, fermentation conditions, methods of filtering and sterilizing the oil, packing and storage etc.

Success story

Coconut is the predominant crop in Andaman and Nicobar Islands, widely cultivated in all the habituated Islands in about 20000 ha. Most of the coconut production from the islands goes for copra production and direct consumption. About 2 to 3 per cent of fruit production is used for other products including tender coconuts. Coconut palms produce fruits throughout the year and the nuts are available round the year. Owing to the lock down due to COVID -19 spread control, the coconuts were gathered in surplus around the palms, plantations and households in the islands. Using the COVID time advisory released from ICAR-CIARI, many farm women, farmers and home makers in Port Blair and surrounding areas started producing Virgin Coconut Oil (VCO) from the available coconuts at their home utilizing their leisure time which yielded high quality pure coconut oil at several homes. The users have indicated that they obtained oil recovery ranged from 900 ml to1200 ml from 10 medium-sized coconuts of Andaman Ordinary Tall cultivar. By this way, they could effectively use and add value to their coconut produce which otherwise could have fetched very low price. Interaction revealed that most of these small scale producers used the home made VCO for the consumption at family level and few others sold the excess oil in the local markets for interested fellow islanders. Now, after three years, few of them has taken this simple method to continue their VCO production at home level successfully as an entrepreneurship opportunity in and around their households.

Conclusion

This simple method of home scale VCO production can be very well followed by any small-scale farmers, agricultural labourers, home homemakers and coconut enthusiasts. They can engage themselves during their leisure time in a productive way. Apart from self consumption, if sales are ensured through local contacts, the venture will be very much profitable without much additional investment. The home made VCO can also meet edible oil requirement of family thereby strengthening self sufficiency and help in ensuring the consumption of healthy coconut oil. If the same method is applied at the community level with shared resources and quality assurance, VCO production can be increased with higher efficiency and profitability.

Coconut biomass waste briquettes

Innovative approach in the valorization of coconut biomass waste

Gadha V.P., Binitha N.K., Sujatha R., T. Sajitha Rani, Boby V. Unnikrishnan, Vyjayanthi P.V., Krishnasree V., Nideesh P., Reshmika P. K.

College of Agriculture, Padannakkad

Introduction

Coconut palm is one of the most extensively cultivated crop in Kerala and it grows virtually everywhere in the state. Nowadays coconut cultivation is severely affected by amplified entemo-pathogenic incidents or by occurrence of climate change and natural disasters. To improve the productivity of coconut, replanting of senile and disease advanced palms are recommended, which results in enormous amount of palm wastes, that can be further used in economically feasible ways like coconut briquettes. Due to high heating value of palm stems, there is a worldwide focus on the production of energy briquettes with palm wastes, especially in countries where its availability is high and inexpensive.

What are briquettes

Briquetting is the process of converting low density biomass into high density and energy concentrated solids ie. briquettes. Briquettes are fuels whose energy conversion occurs through direct burning and are used for heating and cooking, for domestic or industrial uses. The production of briquettes is commonly associated with second-generation biofuels, promoting the reuse of agricultural and forestry residues such as stem, bark, leaves, straw, wood or sawdust. Production of briquettes from waste materials is getting more emphasis in the view of waste management. Solid waste management and the increasing energy demand are a global concern. Waste can act as an alternative fuel, partly reducing the environmental footprint in the waste management sector. Waste briquetting is used as a treatment option for improving waste combustion efficiency, as well as its management and handling. Briquettes are very cheap as they are manufactured from waste. Besides, the product gains more value due to its ease in transport, handling and storage.

Calorific value of briquette is one of the important aspects which affects the combustion behavior and is directly related with efficiency of the briquettes.

Calorific value is measured using bomb calorimeter, and the values are nearly 3300 cal/g for saw dust briquettes and 2300 cal/g for coir pith briquettes. Higher ash content lowers the calorific value. The ash formed during combustion causes slagging and fouling which in turn lead to corrosion. Agricultural waste-based and wood-based briquettes are the most investigated, because they have a calorific value of 16.22 ± 1.65 MJ kg^{-1} and 19.03 ± 2.46 MJ kg^{-1} respectively. Biomass briquettes can meet the energy demands for cooking and heating needs, especially in rural areas where abundant biomass feedstock is available and it is more cost effective compared to electricity, fuel wood, gas and kerosene.

Coconut biomass waste briquettes

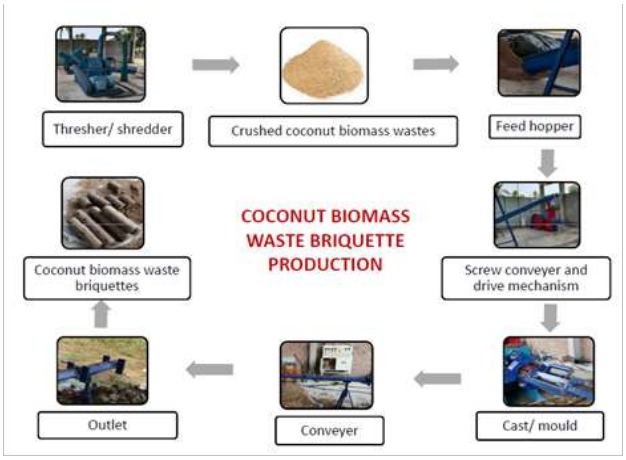
For the production of coconut biomass waste briquettes, the biomass materials like coconut shell, husk, leaf and wood will be collected and sundried. The waste material is powdered either using shredder or thresher machine and then the powder is dried to get a moisture content of 10 to 15 percentage. The ideal size of the dust particle will be 6 to 8 mm in diameter. By feeding the dried coconut biomass waste powder to briquetting machine, cylindrical briquettes of 7.5 cm diameter can be produced.

Shredder and Thresher

Briquette press machine

Properties	Specifications
Diameter (cm)	7.5
Density (g/cm3)	1.15
Moisture content (%)	<5
Ash content (%)	~ 20
Calorific value (MJ/kg)	~ 18
Texture	Smooth
Cohesiveness	Compact
Shape	Cylindrical

Specifications of coconut biomass waste briquettes



Briquette production

Adequate selection and setup of processing variables are fundamental for briquetting optimization. The parameters, such as pressure, temperature, particle size, type of binder and characteristics of the chosen biomass have a great influence on the compression strength, density and energy potential of the briquettes. Based on the applying temperature and pressure, the coconut biomass waste briquettes can be produced in three ways.

Low cost briquetting machines with less efficiency will produce briquettes at low pressure. These machines are comparatively small in size and can be operated manually but addition of different kinds of binders is essential for such briquette production. A binder is a sort of glue (preferably combustible) which is compressed with the briquettes in order to prevent it from falling apart. The binders that are commonly used for making briquettes were cow dung, clay, starch, molasses etc. higher ash content and low heating value are the problems of such briquettes.

Briquettes produced using moderate pressure demands an additional heating at high temperature for setting the briquettes. Now a days briquette press machines using high pressure briquetting are widely accepted because there are no extra requirement of either binders or heating equipments. These types of briquettes have high heating value as well as low ash formation rate whereas its durability is less. High compaction technologies used for making briquettes are piston press and the screw press methods. Piston press machines produces complete solid briquettes where as screw press machine produce hollow briquettes with more surface area. The power consumption in the former is less than that of the latter. But in terms of briquette quality and production procedure, screw press is superior to the piston press technology.

Coconut biomass waste briquettes

Briquetting procedure:

The steps involved in the briquetting of coconut biomass waste are described below,

1. Collection of raw material – easily available biomass waste materials and suitable binders are collected.

2. Crushing - The biomass material is sundried to remove moisture content and then powdered by shredder or thresher and the sample was sieved in order to remove large particles to make uniform briquettes

3. Drying - The pulverized materials are again sun dried to remove remaining moisture content and is completely dried

4. Briquetting - The mixture of biomass and binders are then introduced into the briquetting machine and briquettes are prepared

Future prospects

Coconut biomass waste briquettes are a biofuel substitute to coal and charcoal. As like other biomass briquettes, the main objectives of production of coconut biomass waste briquettes are for using or electricity generation, heat and cooking fuel. In addition to the researches related to fuel efficiency, production of nutrient enriched coconut biomass waste briquettes as a slow release fertilizer is also in progress to increase fertilizer use efficiency and to improve soil physical properties.

Drought Management Strategies in Coconut

G. Chandra Mohan Reddy, T. Susila, VNP Siva Rama Krishan, G. Rajeshwari, Y. Kavya and E. Jeevan Lakshmi

College of Horticulture, AP CARL Campus, Pulivendula, YSR Dist

Dr. YSR Horticultural University, Andhra Pradesh

Introduction

Coconut (*Cocos nucifera L.*) palm often referred to as the "Tree of Life," holds a special place in the agricultural landscape of Karnataka, India.Coconut has many uses, including providing food, beverage, wood, medicine and edible oil and ornamental aesthetics. With a crop area of about 2.15 million hectares, India is the world's third largest coconut producer, growing the crop in four of its southern states: Kerala, Tamil Nadu, Karnataka and Andhra Pradesh. The coconut palm generally grows well in areas receiving an annual rainfall of 1300 to 2500 mm or more. A prolonged dry season lasting for up to four months may adversely affect the palms. This constraint occurs recently in various coconut growing states. This erratic behaviour of monsoon has made the sustainability of coconut production dangerous. The drought stress not only causes decline in productivity and also could be the reason for mortality of palms in extreme cases.

Drought is one of the most important limiting factors for crop productivity and ultimately the food security in the wake of changing climate. The reduced precipitation and changed rainfall patterns are causing the frequent onset of droughts around the world. Severe droughts cause considerable decline in crop yields through negative impacts on plant growth, physiology and reproduction. Plants are subjected to the drought conditions when either the water supply to the root is limited or the loss of water through transpiration is very high. Coconut is mainly grown as a rainfed crop and the productivity is 50% more when cultivated under well irrigated areas. Coconut is a perennial crop with long duration of inflorescence primordia initiation to nut maturity (about 44 months duration). Pre fertilization period is about 32 months and post fertilization period are around 12 months. Hence drought occurred in any of these critical stages of the inflorescence

development stages affects the nut yield. The effects of drought could be observed in next three years. In worst affected situations, it takes four years to recover. Drought at early stages affects the growth and lead to seedling mortality. Depending on the soil type and the critical level of soil moisture, the water stress on coconut varies.

Effect of drought on coconut palm:

Drought stress in plants is characterized by reduced leaf water potential and turgor pressure, stomatal closure, decreased cell growth and enlargement (Farooq *et al.*, 2009). Drought stress reduces the plant growth by influencing various physiological as well as biochemical functions such as photosynthesis, chlorophyll synthesis, nutrient metabolism, iron uptake and translocation, respiration and carbohydrates metabolism (Jaleel *et al.*, 2008 and Farooq *et al.*, 2009) Drought slows down the activity of the growing point of stem. Leaf production is reduced and causes early aging and collapse. Palms without a minimum of about twenty leaves lack the vitality to produce nuts. Droughts arrest spikelet formation in the inflorescence bud, resulting in loss of female flowers. Heavy button

shedding and immature nut fall is observed. Weight of fruit, husk and endosperm is reduced. When soils dry up for prolonged periods, outer cells in the absorbing region of roots develop thickened walls through which water cannot enter. The typical symptoms of drought affected coconut palm is bending and breaking of dry leaves, poor spathe development and bunches with one or two nuts. Activity of roots and transpiration rates also show marked variations.

Drought management techniques:

Drought management involves soil moisture conservation measures like mulching around palms by spreading vegetable material, e.g. coconut fronds, husks, lopping of trees and shrubs and plant management. These strategies should be effectively transferred to the farmers to minimize socio-economic losses of the coconut sector

Mulching:

Mulching can be done with various types of organic materials like dried coconut leaves or any other leaf material. The best time for mulching is before the end of the monsoon and before the top soil dries up. To cover 1.8 m radius of coconut basin, 10 to 15 fallen coconut leaves are required and can be spread in two to three layers. Mulching with composted coir pith to 10 cm thickness (around 40-50 kg/palm) around coconut basin is also an ideal method to conserve moisture. Coir pith can hold moisture five times its weight. Due to its fibrous and loose nature, incorporation of coir pith considerably improves the physical properties and water holding capacity of soil. Coconut husks are also used as surface mulch around the base of the palm. It can hold moisture to the tune 3 to 5 times of its weight. Mulching is usually done up to a radius of 2 m leaving 30 cm near the palm and approximately 250 to 300 husks will be required for mulching one coconut basin. Two layers of husk may be buried in the coconut basin with the concave side facing upwards. Effect of this mulch lasts for about 5-7 years.

Husk burial:

Burial of husk in trenches in between the rows of palms is also effective for moisture conservation in coconut gardens. Husk burial is to be done at the beginning of the monsoon, in linear trenches of 1.2 m width and 0.6 m depth between rows of palms with concave side of husks facing upwards and each layer is to be covered with soil.

Catch pit filled with coconut husk

Catch pits can be constructed at slopes to conserve soil and water. Though there are no standard dimensions for catch pits, catch pits of 1.5 m length x 0.5 m width x 0.5 m depth can be constructed. A bund is to be made at the downside using the excavated soil and pineapple suckers may be planted on it. This pit is also to be filled with coconut husk.

Catch pit filled with coconut husk and farm waste

Catch pits can be constructed at slopes to conserve soil and water. Though there are no standard dimensions for catch pits, catch pits of 1.5 m length x 0.5 m width x 0.5 m depth can be constructed.

A bund is to be made at the downside using the excavated soil and pineapple suckers may be planted on it. This pit is also to be filled with coconut husk.

Half-moon bund around coconut basin reinforced with pineapple

This measure is to be taken up where there is mild slope (15-20%). Here a flat basin with a slight inward slope towards upstream is made by excavating soil from the upstream side and filling the excavated soil at the downstream side. After making the basin, a bund of 30 cm height and >50 cm width is made at the down stream side of the coconut using the excavated soil. Two layers of pineapple plants could be planted with a spacing of 20 cm row to row and 20 cm plant to plant on the bund. The bund prevents runoff and water gets collected within the basin and percolates down. Pineapple would help to protect the bund and stabilize the same in addition to giving fruit yield.

• **Pottasium application:** Potassium can be applied at double recommended dose than regular fertilizer application. Common salt also applied at 2kg/ palm. Potassium regulates water economy and thus enabling the palm to withstand drought. Potassium is also known to help root development in certain locations, enabling the palm to take up more nutrients from the soil.

Conclusion

Coconut palm is influenced both by environmental and soil droughts, as the palms are mainly cultivated on the coastal sandy, red sandy loam and laterite soils as rainfed crop. Drought induces several biochemical and physiological responses in plants, and it is one of the most adverse environmental factors of coconut plant growth and nut production. As coconut is perennial in nature, the impact of drought stress will be having long-standing ill effects, consequently, which may adversely affect the economy of coconut sector. Hence there is much need for the adoption of mitigation measures for soil moisture conservation techniques to manage the drought conditions in coconut without hampering the nut production.

Krushi Odisha-2024

The Department of Agriculture and Farmers' Welfare, Government of Odisha in association with FICCI organized Krushi Odisha 2024 a State Level Agricultural Exhibition on the theme Celebrating Women in Agriculture at Janata Maidan, Bhubaneswar from 12th to 14th January, 2024. Krushi Odisha 2024 provided a platform for interaction and collaboration among women farmers, Self-Help Groups (SHGs), Women Agri-entrepreneurs, market players, and service providers. Exhibition, Investors Meet, Farmer Scientist Interactions, Farmers Felicitations, Extension Functionaries Conferences and Cultural Programme etc. were organized as part of the programme.

The State Level Agricultural Exhibition was inaugurated by Honorable Chief Minister, Shri. Naveen Pattnaik on 12th January, 2024. Coconut Development Board, State Centre, Pitapalli showcased different coconut based value added products. Around 2000 people including 600 farmers visited the stall of Coconut Development Board. Officials of Coconut Development Board briefed the visitors on Coconut Cultivation Technology, Value Added Products, different ongoing schemes of the Board etc. Leaflets, Booklets, and Journals were distributed among the visitors for creating awareness on the various schemes of the Board and also on the goodness of coconut.

Rugose spiraling whitefly (RSW)–nut yield reduction in East Coast Tall (ECT) coconut palms

P. Viswanadha Raghuteja[1] and N. B. V.Chalapathi Rao[2]

[1] Dr. YSR HU –College of Horticulture (COH), Venkataramannagudem, West Godavari, Andhra Pradesh

[2] YSR HU - Horticultural Research Station (HRS), Ambajipeta,
Dr. B. R. Ambedkar Konaseema, Andhra Pradesh

Introduction

Coconut, *Cocos nucifera L.*, [*Fam. Arecaceae*] regarded as "Kalpavriksha" and "Tree of Abundance" is generating source of revenue to billions of people worldwide (Ahuja *et al.* 2014). In India it is grown in 2.15 million ha area, with production and productivity of 19,309.90 million nuts and 8960 nuts/ha in 2020-22. In the present scenario of climatic change this valuable palm is damaged by various pests and disease incidences that not only deteriorate the quality of nuts but also reduced the vigour and yield of palms (Chowdappa *et al.*2018). In this recent times, damage of coconut palms can be identified with invasion of exotic insect pests, particularly whiteflies. Among different invasive whiteflies, rugose spiraling whitefly (RSW), *Aleurodicus rugioperculetus Martin* has been reported from India in Tamil Nadu (Sundararaj and Selvaraj, 2017) and Andhra Pradesh (Chalapathi Rao *et al.*2018). The invasive RSW feeds and reproduces prolifically on under surface of coconut palm leaves and as a result secretes honey dew. This honeydew secretion facilitates the sooty mould growth on leaves, degrades photosynthetic activity and vigour, leading to yield loss in coconut palms. Previous investigations of Chandrika *et al.*(2010) estimated nut yield reduction by 45.4 per cent from *Opisinia arenosella W.* infested coconut palms. Later in the year 2011, Rajan *et al.*reported that slug caterpillar (*Macroplecta nararia M.*) inflicts higher yield losses up to 90-95 per cent. Nut yield reduction must be estimated to plan realistically for research and development policies. As a result, the study was undertaken to assess yield reduction in terms of harvested nuts of ECT palms attributable to *A. rugioperculatus* infestation under variable incidences.

Estimation of yield loss (%) in RSW infested East Coast Tall (ECT) variety

Appraisal of yield loss (%) investigations in RSW infested coconut palms of local East Coast Tall (ECT) variety (25 years and 20 years) under low (<10 spirals per leaflet), medium (10 – 20 spirals per leaflet) and high (> 20 spirals per leaflet) (Srinivasan *et al.*, 2016)incidence were undertaken at Dr. YSR HU - Horticultural Research Station (HRS), Ambajipeta

(16°59'38"NL and 81°95'36" EL) and Kalavalapalli plantations (16°94'82" NL and 81°63'98" EL) of Andhra Pradesh, India. The data on collected nuts number per palm were noted at monthly intervals during 2020-21 at Dr. YSRHU - HRS, Ambajipeta and Kalavalapalli village. Data was noted on five selected palms in local East Coast Tall (ECT) variety as and when harvesting was carried out meticulously under varied RSW intensities. The data was also obtained for preceding three years (2018-20) from yield record registers maintained in the research station as to compare the yield and to calculate the nut loss (%) at Ambajipeta and Kalavalapalli villages.

The yield loss was estimated to be comparatively less (6.61 per cent) in ECT palms with low incidence, whereas in medium and high incidence of RSW, nut yield reduction by 22.45 and 27.49 per cent respectively was observed at HRS, Ambajipeta. At Kalavalapalli the yield loss was recorded 6.49 per cent in ECT palms with low incidence, whereas in medium and high incidence, the nut yield reduction by 25.65 and 30.38 per cent was estimated respectively.This work concluded that yield loss (%) was insignificant in RSW infested ECT palms with low incidence (< 10 spirals per leaflet) (6.61 and 6.49 per cent), whereas greater loss was valued in palms with those of medium (10 – 20 spirals per leaflet) (22.45 and 25.65 per cent) and high RSW incidence (> 20 spirals per leaflet) (27.59 and 30.38 per cent) at both experimental trials.

Acknowledgements

The author would like to express deepest gratitude to scientific and non-scientific staff of Dr. YSR HU - Horticultural Research Station (HRS), Ambajipeta for providing all necessary facilities during this investigation.

References

Ahuja SC, Ahuja U, Ahuja S (2014) Coconut - history, uses, and folklore. Asian Agricultural History 18(3): 221-244

Chalapathi NBVR, Rakshith RD, Krishna RG, Ramanandam G (2018) A review on rugose spiralling whitefly, Aleurodicus rugioperculatus Martin (Hemiptera: Aleyrodidae) in India. Journal of Pharmacognosy and Phytochemistry 7(5): 948-953

Chandrika M, Radhakrishnan CPN, Kesavan CN, Rajan P (2010) Leaf eating caterpillar (Opisinia arenosella) - induced yield loss in coconut palm. International Journal of Tropical Insect Sciences 30(3): 132-137

Chowdappa P, Hedge V, Chandrika M, Josephraj KA, Merin B (2018) Pest and disease free coconut. Indian Coconut Journal61 (2): 24-28

Nair DS, Pramod PK (2021) Role of Coconut Development Board in development of coconut sector of the country. The Indian Coconut Journal 64 (6): 23-26

Rajan P, Josephraj KA, Sujatha A (2011) Gradient outbreak of coconut Slug Caterpillar, Macroplecta nararia Moore in East Coast of India. Cord27 (1): 61-69

Srinivasan T, Saravanan PA, Josephraj KA, Rajamanickam K, Sridharan S, David PMM, Natarajan N and Shoba N. 2016. Invasion of the rugose spiralling whitefly, Aleurodicus rugioperculatus Martin (Hemiptera: Aleyrodidae) in Pollachi tract of Tamil Nadu, India. Madras Agricultural Journal, 103: 349-353.

Sundararaj R, Selvaraj K (2017) Invasion of rugose spiralling whitefly, Aleurodicus rugioperculatus Martin (Hemiptera: Aleyrodidae): a potential threat to coconut in India. Phytoparasitica DOI: 10.1007/s12600-017-0567-0.

Coconut Development Board observed 44th Foundation Day

Farmer's Seminar

Coconut Development Board organized a Farmer's Seminar on its 44th foundation day on 12th January 2024 in Alappuzha, Kerala. Dr. Regi Jacob, Head, ICAR – CPCRI Regional Station, Kayamkulam inaugurated the programme. In his inaugural address he spoke on the prospects of coconut farming and the need for venturing into processing and value addition. Smt. Mini Mathew, Assistant Director, Publicity & Public Relations, CDB presided over the programme. Shri. Kattanam Shaji, Chairman,Onattukara Coconut Producer Company; Adv. Thomas M Mathunny, President, Bharanikkavu Panchayath Coconut Producer Federation and Dr. Remany Gopalakrishnan, former Director CDB and CEO, Onattukara Coconut Producer Company spoke on the occasion. Smt. Mini Mathew, Assistant Director detailed about the programmes and schemes of Coconut Development Board; Dr. Jilu V Sajan, Scientist CPCRI, spoke on scientific coconut cultivation, and Smt. Vincy Varghese, Development Officer, CDB explained about coconut processing and value addition. Around 300 farmers, officials from Alappuzha District Agriculture Department, Coconut Development Board and Central Plantation Crops Research Institute attended the programme. An exhibition of coconut value added products was also held along with the Farmer's Seminar.

Awareness cum training program on Value addition in Coconut

CDB Institute of Technology conducted awareness cum training program on Value addition in Coconut for Farmers/ entrepreneurs/women SHGs in connection with the Foundation Day of CDB. 25 participants from various wards under South Vazhakulam Grama panchayath attended the programme. Apart from awareness session, demonstration of three Coconut products was also included in the program.

District Level Seminars

CDB, Regional Office, Tamil Nadu in association with KVK Krishnagiri conducted district Level Seminar in connection with CDB Foundation Day. Around 100 participants attended the seminar. CDB, Regional Office, Karnataka in association with University of Agricultural Sciences, DSP Farm Mandya and KVK Mandya conducted district Level Seminar in connection with Foundation Day at Training Hall of KVK. Around 100 participants attended the seminar. CDB, Regional Office, Bihar conducted district level seminar in connection

with Foundation Day at KVK Madhopur, West Champaran. CDB, State Centre, Andhra Pradesh conducted district level programme in connection with Foundation Day at Dr. YSRHU - HRS, Vijayara, Eluru district . CDB, State Centre, West Bengal conducted district level seminar on the foundation day of CDB on 12th January 2024 at Ramakrishna Ashram, Dhanyaganga KVK, Murshidabad. More than 200 farmers attended the seminar.






Block Level Seminars

CDB, Regional Office, Assam, CDB, SC, Odisha ,DSP Farm, Neriamangalam, Kerala, DSP Farm, Abhayapuri, Assam, DSP Farm, Madhepura, Bihar, DSP Farm, Dhali, Tamil Nadu, DSP Farm, Hitchachara,Tripura, DSP Farm, Kondagaon, Chhattisgrah and Field Office, Thiruvananthapuram organised block level seminars as part of the 44th Foundation day of the Board.








ICAR-CPCRI Kasaragod Celebrated Foundation Day

ICAR-Central Plantation Crops Research Institute, Kasaragod celebrated 108th Foundation Day on Friday 5th January 2024. Dr. N. K. Krishna Kumar, Former Deputy Director General (Horticultural Science), ICAR, New Delhi delivered the Foundation day address.

Dr. George V Thomas, former Director, ICAR-CPCRI Kasaragod delivered Dr. K.V. Ahamed Bavappa memorial lecture. Dr. K. B. Hebbar, Director, ICAR-CPCRI welcomed the gathering and gave introductory remarks.

Dr. J. Dinakara Adiga, Director, ICAR-Directorate of Cashew Research, Puttur offered felicitations and distributed certificates to participants of training programme sponsored by Coconut Development Board on 'Hybridization technique in coconut'.

Dr Anitha Karun, former Director, ICAR-CPCRI Kasaragod released two publications viz., Crop health management in coconut and Cocoa cultivation and offered felicitations.

Dr. B. Hanumanthe Gowda, Chief Coconut Development Officer, Coconut Development Board, Kochi inaugurated the training programme for Farmer producer Organisations on 'Coconut value addition', and released the publication on Hybridization technique and planting material production in coconut and offered felicitations.

Shri. Dadasaheb Desai, Deputy Director, Directorate of Cashew nut and Cocoa Development, Kochi released the Institute technology calendar and offered felicitations.

Exchange of MoUs/Material Transfer Agreements on different technologies with entrepreneurs and other stakeholders was also made during the Foundation day celebrations.

Selected representatives of FPOs from Tamil Nadu, extension personnel from Tamil Nadu, Karnataka and Kerala participated in the Foundation day programme besides the staff members from the head quarter Kasaragod, Regional Stations Kayangulam and Vittal, Research Centres Kahikuchi, Mohitnagar and Kidu and retired personnel of CPCRI.

Dr. Thamban C, Principal Scientist (Agricultural Extension) proposed vote of thanks.

ICAR-CPCRI Distributed Coconut Climbing Devices

Coconut climbing devices were distributed to 50 selected scheduled tribe youths under the Scheduled Tribe Component (STC) scheme of ICAR-CPCRI Kasaragod on its 108th Foundation day on 5th January 2024. Dr. George. V. Thomas, Former Director, ICAR-CPCRI inaugurated the distribution of climbing devices. Dr. N. K. Krishna Kumar, Former DDG (Hort. Science) also distributed climbing devices.

Training programme on 'Scientific coconut cultivation and quality seedling production'

ICAR-CPCRI in association with the Ranipuram Farmers Producer Company conducted a training programme under the Scheduled Tribe Component (STC) scheme of CPCRI on 'Scientific coconut cultivation and quality seedling production' for selected Scheduled Tribe farmers on 19th December 2023 at Panathady. Dr. K.B. Hebbar, Director ICAR-CPCRI inaugurated the training programme. Inauguration of distribution of coconut seedlings under STC to selected scheduled tribe farmers was also done by Dr Hebbar during the occasion. Mrs. Prasanna Prasad, President Panathady grama panchayat presided over the inaugural function. Dr. P.Subramanian, Head,

Division of Crop Production, Dr.Thamban C, Principal Scientist and Dr. K. Samsudeen Principal Scientist handled different topics in the training programme. 124 scheduled tribe farmers attended the training programme.

Cultivation Practices for Coconut -February

Collection and storage of seed nuts

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

Irrigation has to be continued. 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. Spraying of water on the lower surface of leaves of seedlings can be done against spiralling white fly attack.

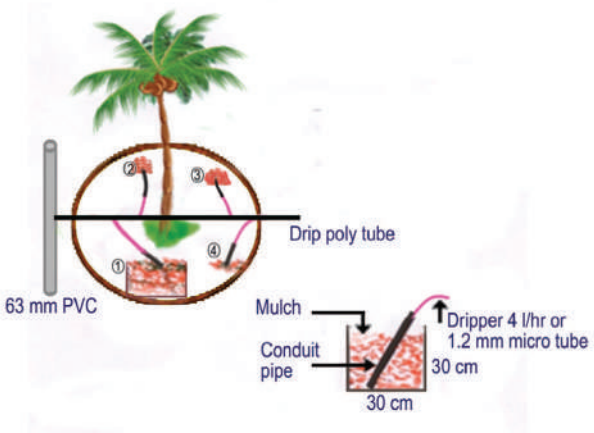
Shading

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

Irrigation

Irrigation has to be continued in coconut gardens. If basin irrigation method is adopted, provide irrigation once in four days @ 200 litres per palm. Drip irrigation is the ideal method of irrigation for coconut. The number of dripping points should be six for sandy soils and four for other soil types. Depending on the evaporation rate, quantity of water to be provided through drip irrigation system can be decided in different coconut growing tracts. In Kerala 30-35 litres and in Tamil Nadu and Karnataka 35-45 litres of water is sufficient per palm per day through drip irrigation system.

Drip irrigation layout and installation



Moisture conservation

Mulching and other soil and moisture conservation practices should be adopted if not done earlier.

Plant protection

With the temperature shooting up high even in January, it is likely that the month of February will be dry. Nights remain still cooler, humidity percentage slowly comes down and the evaporation level increases. The areas adjoining river and brackish

water as well as midland regions favours emergence of sucking pests like rugose spiralling whitefly and other whiteflies during this period. Several coconut gardens in Kerala, Tamil Nadu, Andhra Pradesh, Karnataka and Lakshadweep Islands (Kavaratti and Minicoy) are heavily infested with rugose spiralling whitefly or nesting whiteflies or occurring in synergy. There will be a shift in the parasitism level favouring the pest population to flare up especially on juvenile palms and coconut nursery. The sooty mould scavenger beetle population recedes after the withdrawal of rainfall. Strict domestic quarantine in the transport of coconut seedlings or ornamental palms should be ensured. The sustenance of key pests like black headed caterpillar and slug caterpillars in endemic zones are to be understood keenly and management strategies need to evolved accordingly. The dry pathogens like leaf rot disease


Leaf and inflorescence damage


Shielding by fish net


Metarhizium infected grub

and basal stem rot disease could increase in the endemic regions as well.

▶ *Rhinoceros beetle (Oryctes rhinoceros)*

Being a ubiquitous pest, the incidence of rhinoceros beetle is quite common during all periods. However its damage is well pronounced during monsoon phase when seedlings are also planted. In seedlings just planted, the spear leaf gets damaged and distorted by beetle damage. Juvenile palms are also prone to pest attack and sometimes appearing as elephant tusk-like symptoms. Damaged juvenile palms are stunted and get delayed in flowering. Of late incidence of nut boring symptoms are also noticed. Moreover, the attack by rhinoceros beetle would invariable incite egg laying by red palm weevil as well as entry of bud rot pathogen in this period.

Management

- Prophylactic treatment of top most three leaf axils with either botanical cake [Neem cake /marotti cake / pongam cake (250 g)] admixed with equal volume of sand or placement of 12 g naphthalene balls covered with sand.
- Routine palm scrutiny during morning hours and hooking out the beetle from the infested site reduces the floating pest population. This strategy could reduce the pest population significantly.
- Shielding the spear leaf area of juvenile palms with fish net could effectively entangle alighting rhinoceros beetles and placement of perforated sachets containing 3 g chlorantraniliprole /fipronil on top most three leaf axils evade pest incursion.
- Dairy farmers could treat the manure pits with green muscardine fungus, *Metarhizium anisopliae* @ 5 x 1011 /m3 to induce epizootics on the developing grubs of rhinoceros beetle. Area-wide farmer-participatory approach in technology adoption could reduce the pest incidence very effectively and forms an eco-friendly approach in pest suppression.
- Incorporation of the weed plant, *Clerodendron infortunatum* in to the breeding pits caused hormonal irregularities resulting in morphogenetic transformational aberration in the immature stages of the pest.
- Crop diversity induced by intercropping and ecological engineering principles would disorient pests and provide continuous income and employment as well.

▶ *Rugose Spiralling Whitefly (Aleurodicus rugioperculatus)*

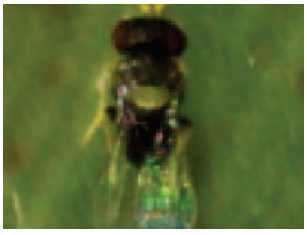
This period could also witness the establishment of the invasive rugose spiralling whitefly (Aleurodicus rugioperculatus) in new areas as well as re-emergence in already reported areas. The pest population is increasing very high due to favourable weather factors of high day temperature and fall in relative humidity. Presence of whitefly colonies on the under 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. Continuous feeding by whiteflies cause health deterioration in palms for which agronomic care is very critical.

Management

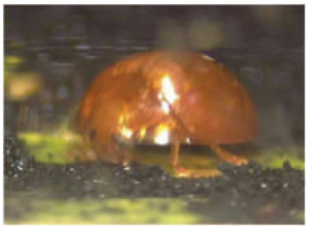
- In juvenile palms, spraying of water with jet speed could dislodge the whitefly and reduce the feeding as well as breeding potential of the pest.
- Ensure good nutrition based on soil-test recommendations and adequate watering to improve the health of juvenile and adult palms. Agronomic health management of palms is very crucial including planting of intercrops wherever possible to diversify volatile cues and improve microclimate disfavouring

Rugose spiraliing whitefly

Parasitized pupa



Encarsia guadeloupae



Sooty mould scavenger beetle

flare up of whitefly.

● 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.

▶ *Nesting whiteflies (Paraleyrodes bondari and Paraleyrodesminei)*

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 from 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 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. Nesting whiteflies compete with rugose spiralling whitefly and reduce the aggressiveness of rugose spiralling whitefly in many cases.

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 of biological control.

▶ *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 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 (*Brachymeri 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.

Leaf rot disease (*Colletotrichum gloeosporioides, Exserohilum rostratum*)

It is commonly observed on palms affected by root (wilt) disease wherein foliar necrosis of terminal spear leaf and adjacent leaves are registered. The disease is prominently noticed in the post-monsoon phase during the month of December. Affected leaves turn necrotic and are not detachable from the palm and remain intact. This disease could be initially observed as minute lesions which later enlarge, coalesce and cause extensive rotting affecting the photosynthetic efficiency of palms. The disease is endemic to root (wilt) affected regions of Southern Kerala

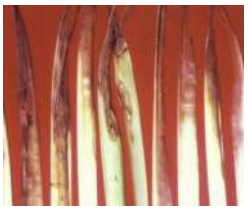
Management

- Need based pruning and destruction of affected spear leaf and other adjacent leaves in the terminal region
- Spot application of hexaconazole 2 ml in 300 ml water on the affected spear leaf region
- Soil test based nutrition for improving the health of the palm and ensure adequate irrigation

Basal stem rot disease *(Ganoderma spp.)*

It is a destructive disease observed in all coconut growing regions and found very severe in soils with higher pH and moisture stress condition. The pathogen invades the root system during early stages of infection that are not visibly noticed. The disease is very severe in areas of Thanjavur, Tamil Nadu parts of East Godavari, Andhra Pradesh and Arsikara, Karanataka. The outer whorl of leaves turn yellowish, then gradually become brown and droop from their point of attachment and hang vertically downwards to form a skirt around the trunk apex. In course of time, the apex of the trunk shows tapering with the advancement of the disease, and bleeding symptoms

Leaf rot disease affected palm



Leaflets

may appear on the bole region. At the base of the stem a characteristic reddish brown discoloration develops, accompanied by the exudation of a brown viscous gummy substance. These brownish patches may extend up to one metre from ground level and at times bark pealing was also observed. Sometimes fruiting bodies (basidiocarp) of the pathogen develop from the affected trunk.

Management

- Avoid burning of trash and palm residues near the trunk to avoid trunk/root injury
- Removal of dead palms and palms in advanced stage of the disease as well as destruction of the boles and root bits of the diseased palms to remove disease inoculums.
- Isolation of neighboring healthy palms, by digging isolation trenches (60 cm deep and 30 cm wide) around the affected palm (1.2 m away from the base of the trunk).
- Application of neem cake (5 kg) fortified with Trichoderma harzianum(CPTD 28)talc formulation (50 g)per palm per year at six monthly intervals reduce the disease intensity.
- Root feeding of hexaconazole @ 2% (100 ml solution per palm) and soil drenching with 0.2 % hexaconazole or with 40 l of 1% Bordeaux mixture in the coconut basin are recommended

Correct and timely diagnosis of insect and mite pests as well as disease causing pathogens would be the key factors for the implementation of effective management solutions. Delayed detection would take a longer time for recovery from pest invasion. Hence, a close scrutiny of palms through effective scouting and timely diagnosis would form the basis in doubling income through increased production. Palm health management is very important to tackle pests and diseases in coconut. ■

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

India's pride - Grow Spices

Read & Advertise in

INDIAN JOURNAL OF ARECANUT, SPICES AND MEDICINAL PLANTS

A quarterly publication in English having wide circulation among farmers, extension and research workers, exporters, industrialists, etc.

Popular and scientific articles on agronomy, plant protection, processing and marketing aspects with profuse illustrations, market review, price statistics, farm operations etc. etc.

Subscription Rates

Inland (4 issues)	₹200.00
Single copy	₹ 50.00
Three years	₹500.00
Foreign (4 issues)	US $ 20.00
Single copy	US $ 5.00

Advertisement tariff rates

	Per insertion	Four insertions
Back cover(B&W)	2000	7500
Colour	4000	15000
Inside Cover(B&W)	2000	6000
Colour	3000	10000
Ordinary page (B&W)	1500	4500
Colour	2000	6000

Subscription for the Journal may be done online through Non Tax Receipt Portal (NTRP) in the website https://bharatkosh.gov.in and the receipt generated (e- receipt) after making payment may be sent by email to spicedte@nic.in or by post to Director, Directorate of Arec anut and spices Development, West Hill P.O, Calicut - 673005

ACCREDITATION OF SPICE NURSERIES

Applications are invited from public and private sector Spice nurseries

Spice nurseries seeking accreditation by Govt. of India have to apply as per the guidelines available in DASD website ***www.dasd.gov.in*** or ***www.spicenurseries.in .***

Director

Directorate of Arecanut and Spices Development

Department of Agriculture, Co-operation & Farmers Welfare
Ministry of Agriculture & Farmers Welfare, Government of India, Calicut-673005, Kerala, India
Telephone: Office- 0495-2369877, Director- 2765501, Fax- 0495-2765777, E-mail: spicedte@nic.in
website: www.dasd.gov.in

Market Review – December 2023

Domestic Price

Coconut Oil

During the month of December 2023, the price of coconut oil opened at Rs. 14000 per quintal at Kochi market, Rs.14200 per quintal at Alappuzha market and Rs.15650 per quintal at Kozhikode market.

The price of coconut oil closed at Rs.13900 per quintal at Kochi, Rs.14100 per quintal at Alappuzha market and Rs.15800 per quintal at Kozhikode market with a net loss of Rs. 100 per quintal at Kochi and Alappuzha market and a net gain of Rs.150 per quintal at Kozhikode market during the month.

During the month, the price of coconut oil at Kangayam market opened at Rs. 11533 per quintal and closed at Rs. 11467 per quintal with a net loss of Rs. 66 per quintal.

Kochi, Alappuzha and Kangayam market showed a downward trend and Kozhikode market expressed an upward trend during the month.

Weekly price of coconut oil at major markets Rs/Quintal)				
	Kochi	Alappuzha	Kozhikode	Kangayam
01.12.2023	14000	14200	15650	11533
09.12.2023	13900	14100	15650	11467
16.12.2023	13900	14100	15650	11400
23.12.2023	13900	14100	15750	11467
30.12.2023	13900	14100	15800	11467

Milling copra

During the month, the price of milling copra opened at Rs.9300 per quintal at Kochi, Rs.9350 per quintal at Alappuzha and Rs.9650 per quintal at Kozhikode market.

The prices of milling copra closed at Rs. 9000 per quintal at Kochi market, Rs. 9200 per quintal at Alappuzha market and Rs. 9850 per quintal at Kozhikode market with a net loss of Rs.300 per quintal at Kochi, Rs.150 per quintal at Alappuzha and a net gain of Rs.200 per quintal at Kozhikode market during the month.

During the month, the price of milling copra at Kangayam market opened at Rs.8500 per quintal and closed at Rs.8375 per quintal with a net loss of Rs.125 per quintal.

**NR-Not reported*

During the month, the price of milling copra at Kochi, Alappuzha and Kangayam market showed a downward trend and Kozhikode market expressed an upward trend.

Weekly price of Milling Copra at major markets (Rs/Quintal)				
	Kochi	Alappuzha	Kozhikode	Kangayam
01.12.2023	9300	9350	9650	8500
09.12.2023	9000	9200	9650	8500
16.12.2023	9000	9200	9750	8500
23.12.2023	9000	9200	9850	8500
30.12.2023	9000	9200	9850	8375

Edible copra

During the month the price of Rajpur copra at Kozhikode market opened at Rs. 9600 per quintal expressed an upward trend during the month and closed at Rs. 10400 per quintal with a net gain of Rs. 800 per quintal.

Weekly price of edible copra at Kozhikode market (Rs/Quintal)	
01.12.2023	9600
09.12.2023	9200
16.12.2023	9400
23.12.2023	9700
30.12.2023	10400

Ball copra

The price of ball copra at Tiptur market opened at Rs. 8000 per quintal and closed at Rs.9000 per quintal with a net gain of Rs. 1000 per quintal.

Weekly price of Ball copra at major markets in Karnataka (Rs/Quintal) (Sorce: Krishimarata vahini)	
01.12.2023	8000
09.12.2023	7800
16.12.2023	8207
23.12.2023	7800
30.12.2023	9000

Dry coconut

At Kozhikode market, the price of dry coconut opened at Rs. 11000 per quintal and closed at the same price during the month.

Weekly price of Dry Coconut at Kozhikode market (Rs/Quintal)	
01.12.2023	11000
09.12.2023	11000
16.12.2023	11000
23.12.2023	11000
30.12.2023	11000

Coconut

At Nedumangad market in Kerala, the price of coconut opened at Rs. 13000 per thousand nuts and closed at the same price during the month.

At Pollachi market in Tamilnadu, the price of coconut opened Rs. 29500 per ton and closed at Rs. 27500 per ton with a net loss of Rs. 200 during the month.

At Bangalore market in Karnataka, the price of coconut opened at Rs. 20000 per thousand nuts and the price was almost steady during the month.

At Mangalore market in Karnataka, the price of coconut opened Rs. 32000 per ton and the price was almost steady during the month.

Weekly price of coconut at major markets				
	Nedu-mangad (Rs./1000 coconuts)#	Pollachi (Rs./ MT) ##	Bangalore Grade-1 coco-nut,(Rs./ 1000 coconuts) ##	Mangalore Black coconut (1 tonne) ##
01.12.2023	13000	29500	20000	32000
09.12.2023	13000	28500	20000	32000
16.12.2023	13000	28000	20000	32000
23.12.2023	13000	28000	20000	32000
30.12.2023	13000	27500	20000	32000

International price

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*
02.12.2023	129	187	237	355
09.12.2023	129	187	208	343
16.12.2023	128	187	208	337
23.12.2023	128	187	233	337
30.12.2023	128	188	234	331
				*Pollachi market

Coconut Oil

International price and domestic price of coconut oil at different international/ domestic markets are 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)	Philip-pines	Indo-nesia	Sri lanka	India*
02.12.2023	1140	1143	NA	1755	1388
09.12.2023	1130	1133	NA	1789	1380
16.12.2023	1094	1119	NA	1774	1372
23.12.2023	1102	1131	NA	1808	1380
30.12.2023	1126	NA	NA	1821	1380
					*Kangayam

Copra

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

Weekly International price of copra in major copra producing countries				
Date	Domestic Price (US$/MT)			
	Philippines	Indonesia	Srilanka	India* * Kangayam
02.12.2023	629	645	1099	1023
09.12.2023	630	645	1055	1023
16.12.2023	624	656	1070	1023
23.12.2023	624	658	1072	1023
30.12.2023	NA	660	1081	1008
				* Kangayam

#(Source: Epaper,Kerala Kaumudi), ##(Source: Star market bulletin)

Coconut Development Board

Dr. Prabhat Kumar
Chief Executive Officer : 0484-2375216

Dr. B. Hanumanthe Gowda
Chief Coconut Development Officer : 0484-2375999

Shri. R. Madhu
Secretary : 0484-2377737

Government of India,
Ministry of Agriculture and Farmer's Welfare
P.B. No.1012, Kera Bhavan, SRV Road,
Kochi – 682 011, Kerala, India.
Email : kochi.cdb@gov.in
Website: https://www.coconutboard.gov.in
Office:0484-2376265, 2377267,
PABX : 2377266, 2376553, Fax:91 484-2377902

Regional Offices

KARNATAKA
Director, Regional Office, Coconut Development Board, Hulimavu, Bannerghatta Road (Beside Horticulture Farm, Govt. of Karnataka), Bangalore South Taluk, Bangalore - 560 076 Karnataka. Ph: (080) 26593750, 26593743 Fax: 080-26594768
E-mail: ro-bnglr@coconutboard.gov.in

ASSAM
Director, Regional Office, Coconut Development Board, Housefed Complex (Sixth Floor), Wireless Basistha Road, Last Gate, Dispur, Guwahati - 781 006. Assam.
Ph: (0361) 2220632
Fax: (0361) 2229794
E-mail: ro-guwahati@coconutboard.gov.in

TAMILNADU
Director,
Regional Office, Coconut Development Board. No. 47, F1, Dr. Ramasami Salai
K.K.Nagar, Chennai - 600 078
Ph: 044-23662684, 23663685
E-mail: ro-chennai@coconutboard.gov.in

BIHAR
Director,
Regional Office,
Phulwari Road, Jagdev path, Phulwari Road, Patna - 800 014, Bihar,
Phone: 0612-29720200
Email- ro-patna@coconutboard.gov.in

State Centres

ANDAMAN & NICOBAR ISLANDS
Dy. Director, State Centre, Coconut Development Board, House MB No.54, Gurudwara Lane, Near Head Post Office, Opp. BSNL Quarters, Port Blair - 744 101, South Andaman. Ph: (03192) 233918
E-mail: sc-andaman@coconutboard.gov.in

ANDHRA PRADESH
Dy. Director, State Centre, Coconut Development Board, D. No. 54-14/5-18A, Road No. 11, Bharati Nagar, Near Novotel Varun Hotel, Ring Road, NTR District, Vijayawada 520 008 Andhra Pradesh
Phone.: 0866-2472723
e-mail: sc-vijayawada@coconutboard.gov.in

MAHARASHTRA
Dy. Director, State Centre, Coconut Development Board,Flat No. 203, 2nd Floor, Eucalyptus Building, Ghodbundar, Thane West - 400 610. Maharashtra.
Ph: 022-65100106
E-mail: sc-thane@coconutboard.gov.in

ODISHA
Dy. Director, State Centre, Coconut Development Board, Pitapally, Kumarbasta PO, District Khurda - 752 055 Odisha. Ph: 8280067723,
E-mail: sc-pitapalli@coconutboard.gov.in

WEST BENGAL
Dy. Director, State Centre, Coconut Development Board, DA-94 - Sector - I, Salt Lake City, Kolkata - 700 064. West Bengal, Ph: (033) 23599674
Fax: (033) 23599674
E-mail: sc-kolkata@coconutboard.gov.in

GUJARAT
State Centre, Junagadh, B-Wing, 1st Floor, Bahumali Bhavan, State Highway 31, Duruvesh Nagar, Shashikunj, Junagadh, Gujarat, 362001
Ph: 02852990230
E-mail: sc-junagadh@coconutboard.gov.in

Market Development cum Information Centre
Asst. Director, Market Development cum Information Centre, Coconut Development Board, 120, Hargobind Enclave, New Delhi - 110 092.
Ph: (011) 22377805 Fax: (011) 22377806
E-mail:mdic-delhi@coconutboard.gov.in

CDB Institute of Technology (CIT), Technology Development Centre and Quality Testing Laboratory,
Dy. Director, Technology Development Centre, Quality Testing Laboratory and CIT, Coconut Development Board, Keenpuram, South Vazhakkulam, Aluva, Ernakulam District. Pin - 683 105. Kerala. Ph: (0484) 2679680
Email: cit-aluva@coconutboard.gov.in

Field Office Thiruvananthapuram
Coconut Development Board, Agricultural Urban Wholesale Market (World Market), Anayara PO, Thiruvananthapuram. Pin 695 029 Kerala Ph: 0471 2741006
E-mail: fo-tvprm@coconutboard.gov.in

Demonstration-cum-Seed Production (DSP) Farms

ANDHRA PRADESH, Asst. Director, DSP Farm, Coconut Development Board, Vegivada (Village) P.O, Tadikalapudi (Via), W. Godavari (Dist.) Andhra Pradesh - 534 452. Ph: 8331869886, E-mail: f-vegiwada@coconutboard.gov.in

ASSAM- Farm Manager, DSP Farm, Coconut Development Board, Abhayapuri, Bongaigoan, Assam - 783 384. Ph: 03664 -262491 Email: f-abhayapuri@coconutboard.gov.in

KARNATAKA - Farm Manager, DSP Farm, Coconut Development Board, Loksara P.O., Mandya District, Karnataka - 571 478 Ph: 08232 298015 E-mail: f-mandya@coconutboard.gov.in

KERALA - Asst. Director, DSP Farm, Coconut Development Board, Neriamangalam, Kerala Pin-686 693. Ph: (0485) 2554240 E-mail: f-neriamangalam@coconutboard.gov.in

ODISHA - Farm Manager, DSP Farm, Coconut Development Board, At Pitapally, Post Kumarbasta,District Khurda - 752 055, Odisha. Ph:8280067723, E-mail: f-pitapalli@coconutboard.gov.in

BIHAR - Farm Manager, DSP Farm, Coconut Development Board, P.O. Singheshwar - 852 128, Madhepura District, Bihar. Ph: (06476) 283015 E-mail: f-madhepura@coconutboard.gov.in

CHATTISGARH - Asst. Director, DSP Farm, Coconut Development Board, Kondagaon - 494 226, Bastar District, Chhattisgarh. Ph: (07786) 242443 Fax: (07786) 242443 E-mail: f-kondagaon@coconutboard.gov.in

MAHARASHTRA - Farm Manager DSP Farm, Coconut Development Board, Dapoli Village, Satpati PO, Palghar District, Pin - 401405, Maharashtra. Ph: (02525) 256090 Mob:07767948448 & 7776940774 E-mail: f-palghar@coconutboard.gov.in

TAMIL NADU - Farm Manager DSP Farm, Coconut Development Board, Dhali, Thirumoorthy Nagar PO, Udumalpet, Tamil Nadu 642 112 Ph: (04252) 265430 Email: f-dhali@coconutboard.gov.in

TRIPURA - Farm Manager, DSP Farm, Coconut Development Board, Hichachera, Sakbari PO, Via: Jolaibari, Sabroom, SouthTripura, Tripura Pin:799141 Ph: 03823263059 Email: f-hitchachara@coconutboard.gov.in

WEST BENGAL -Farm Manager, DSP Farm, Coconut Development Board, Fulia,1st Floor, Near SBI Bank, Fulia Branch, NH-34, PO Belemath, Fulia, Nadia, West Bengal, 741402. Phone: 03473-234002, E-mail- f-fulia@coconutboard.gov.in

January 2024
Vol. LXVI No.07
Price: Rs.6

Registered No.KL/EKM/721/2024-26
Licence No. KL/CR/EKM/WPP-9/2024-26
Licensed to Post Without Prepayment
RNI No. 3032/1957

INDIAN COCONUT JOURNAL
Date of Publication - 24/1/2024

Printed and Published by Mini Mathew on behalf of Coconut Development Board, Printed at M/s KBPS, Kakkanad, Kochi-30
and Published at Coconut Development Board, Govt. of India,
Ministry of Agriculture and Farmer's Welfare, Kera Bhavan, Kochi-11, Editor: Deepthi Nair S