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Message from the Chairman's Desk



Dear friends,

It is my proud privilege to inform you all that I have taken over as the Chairman, Coconut Development Board. I had the opportunity to closely associate with this sector while serving as the Principal Secretary, Agriculture and Agriculture Production Commissioner, Government of Kerala. I dedicate my new assignment to the farmer families and other stakeholders associated with the Indian coconut sector.

As you all are aware, the Coconut Development Board is a statutory body functioning under the Ministry of Agriculture and Farmers Welfare, Government of India aimed at integrated development of coconut farming and associated industry in the country as well as the well being of coconut farmers. Through the concerted and consistent efforts of the Board, the sector has ventured into new areas like processing and value addition, manufacturing of novel products, introduction of modern technologies, quality standards and innovative marketing strategies. Special mention must also be made of the intensified intervention through the three tier Farmer Producer Organizations.

In spite of all these, the coconut sector of the country is still facing many a challenge. Lack of effective management technologies for certain pests and diseases especially root wilt disease still holds a great threat to the coconut farming in the country. The sector has also been reeling under frequent price fluctuations. The need of the hour is to make a frontal assault on the citadels of all these problems and thereby bring about a turnaround in the rural dimension of our development discourse. Procurement schemes for instance need to be reviewed for ensuring a fair, reasonable and steady price to the farmer. Since coconut is a perennial crop and seasonal variation in production is not so predominant, limiting PSS (Price Support Scheme) operations to a prefixed term has to be replaced by a better frame work. Moreover, safety nets against collapse in yield for reasons varying from inadequate moisture to pest attack need to be revamped and revitalized. The Friends of Coconut Tree programme implemented by the Board for meeting the dearth of coconut climbers must be modulated so as to achieve its solemn objectives.



Rome was not built in a day and the same is true of the farming arena of the country. What we need are not schemes that run the risk of turning into just another serenade, but those that are implemented in ways that can actually make much difference on the ground. Needless to say, such schemes can only be implemented with people's participation as the bed rock. But let me hasten to state that any change sweeping the sector and ushering in a new dawn must have the farmers – the poor tillers who nurture our food basket - at the centre and must ensure that they are treated with utmost respect and appreciation.

August ushered in our annual Independence Day. Independence means enjoying freedom and empowering others too to let them do so. Freedom is power to do, to be and to say. That is why Independence Day reminds us of the war after the war-the war against economic and social inequality- the war for the have-nots, the war for the masses who are rejecting arbitrariness, impunity and economic vulnerability and are looking to level up in life. These people are not craving for our sympathy or platitudes but for concerted action. And unfortunately in our country, these people include a large chunk of the farming community who toil and moil to feed the nation. Let us join hands to ensure that the tryst with destiny to which we redeemed our pledge on the midnight of 14th August 1947 does not turn into a tryst with destitution for them. Let not the locusts of despair destroy the harvest of India's freedom.

I promise to dedicate and devote my service as Chairman, Coconut Development Board for the integrated development of one and all associated with this sector and humbly solicit your whole hearted support and cooperation in all the future endeavours of the Board.

'In some faint dawn
In some dim eve
Like a gesture of light
Like a dream of delight'

Let us strive together for a better future – 'with freedom in our minds, faith in the words and pride in our souls'

Jai Hind

S/d

Dr. Raju Narayana Swamy IAS
Chairman



Dr. Raju Narayana Swamy IAS appointed as Chairman, Coconut Development Board



Dr. Raju Narayana Swamy IAS, took over as Chairman, Coconut Development Board on 8th August 2018. He has held several posts including Agriculture Production Commissioner and Principal Secretary (Agri), Government of Kerala, District Collector in Thrissur, Kottayam, Idukki, Kasargod and Pathanamthitta districts, Director of Fisheries and of Collegiate Education, Managing Director of Marketing Federation and Commissioner in Civil Supplies Department. Recently he was the International Observer for Zimbabwe General Elections.

Dr. Raju Narayana Swamy is a 1991 batch Kerala cadre IAS officer who has taken his graduation in Computer Science and Engineering from IIT, Chennai. He was awarded doctorate by Amrita Vishwa Vidyapeetham. He also holds PG Diploma in IPR (Intellectual Property Right) from National Law School, Bangalore and a Professional Diploma in Public Procurement from World Bank.

Dr. Raju Narayana Swamy has written 28 books of different genres. He won the Kerala Sahitya Akademi award for his travelogue, Santhimantram Muzhangunna Thazvarayil, is the recipient of Bhima Gold Medal and Kunhunni Award (both for children's literature) and the prestigious Homi Bhabha Fellowship (in Cyber Law).

Dr. B N S Murthy relinquished charge



Dr. B N S Murthy relinquished charge of Chairman Coconut Development Board. As Horticulture Commissioner, Government of India, Dr. Murthy was holding the additional charge of Chairman, Coconut Development Board.

20th WORLD COCONUT DAY

2nd September 2018

**"Coconut for
Good Health,
Wealth &
Wellness"**

Jnanadevan.R, Deputy Director, CDB, Kochi -11

We are celebrating September 2nd as 'World Coconut Day' every year to acknowledge the importance of coconut the most useful tree in the life of human beings. Asian and Pacific Coconut Community (APCC) in its 25th ministerial meeting in 1998 took a decision to observe its foundation day, 2nd September every year as world coconut day. APCC was formed in the year 1969 as an intergovernmental organization under the aegis of Economic and Social Commission Asia and Pacific (ESCAP) for strengthening the regional cooperation among the coconut producing countries. Starting with only three countries India, Indonesia and Philippines the community is now composed of 18 member countries. The first coconut day was celebrated on 2nd September 1999.

The objective of observing coconut day is to create increased awareness on the goodness of coconut and focus national and international attention to this crop and to enhance its potential to alleviate poverty, encourage investment in the sector and

promote the total development of coconut industry in the coconut producing countries. This occasion recall the significance of coconut in human life and its relationship with the social cultural and economic wellbeing of humans. Coconut is described as 'the tree of life' because of its unique property by providing food, nutrition, drink, health, aesthetic value and other useful household materials. As natural and eco friendly choice, coconut has a future and potential to score on carbon credit also. On World Coconut day the importance of this tree is propagated and its value is made aware in the life of human beings.

Every year APCC announces a theme message for propagating among people to improve the socioeconomic status of coconut industry. The message given by APCC on the first coconut Day in 1999 was "Plant coconut, Eat coconut, Drink coconut and Use coconut". This message is meaningful in the present context also. APCC wishes to continue focus on the daily benefits and usefulness of coconut to



the health and wealth of families and therefore they announced the 2018 Coconut Day theme as “Coconut for good health, wealth and wellness”. Coconut palm is the attribute of health and wealth of people wherever it grows. Being a nutrient rich food item and an economical and ecological sustainable crop, coconut is now getting a wide range of demand all over the world market. Coconut is an important food crop for the major chunk of Indian population. Coconut and coconut products especially Virgin Coconut Oil (VCO) is gaining popularity through out the world due to its contributing factor to the health, nutrition and wellness of human beings. This is due to its multiple medicinal and nutraceutical properties being revealed day by day. Popularizing the health, nutrition benefit of coconut oil and coconut products in the national and international level is another focus area identified by the Board. Virgin Coconut Oil is nowadays getting more popular among people as a functional food since it contains ingredients that give health promoting properties over and above its nutritional properties. VCO is also considered as a nutraceutical product because it provides nutrients good for health and reduce the risk of chronic diseases. In Philippines, VCO value chain starts from farmers and end with medical shops. Medical shops have also started participating in VCO value chain. The fact that, out of the 90% saturated fatty acids contained in coconut oil 75% is Medium Chain fatty acids which is good for health which is being revealed day by day. More clinical studies need to be conducted. This new development in health sector brought in unprecedented increase in demand of coconut products in domestic and international markets.

In the recent past many new programmes were introduced by Coconut Development Board, in coconut sector which has helped India to improve the coconut situation substantially. Successful implementation of schemes like, demonstration of Integrated Nutrient Management practices (INM) in

farmers field and Replanting and rejuvenation of old, root(wilt) disease advanced trees for productivity improvement, Technology Mission on Coconut, training for palm climbing and coconut management, formation of coconut farmers’ organizations, coconut palm insurance and development of processing technologies for value added products have brought much benefits to the small and marginal coconut farmers in the country. Organized functioning of farmer collectives facilitated by the Board ensured proper management of coconut gardens which also helped in increased production and productivity.

In the eve of celebrating 20th World coconut Day India has emerged as the number one coconut producing country in the world with a considerably high productivity. Still much more remains to be done in Indian coconut sector. Increase in production of coconut was due to productivity factor but the area under coconut also have to be increased to bring about almost equal contribution of both the factors to coconut production. Area under coconut will have to be expanded to non coconut growing states. India is yet to become a prominent export earner in coconut sector. Possibly due to the good domestic demand and an assured market, serious attempt for export was not made so far. New strategies for export improvement are being formulated by CDB to support export promotion of traditional products like coconut oil, coir, desiccated coconut etc. India is the largest consumer of coconut in the world. Almost 95% of production in the country is consumed indigenously.

India celebrates World Coconut Day under the auspices of Coconut Development Board, CPCRI, Department of Agriculture/Horticulture and state Agriculture universities. This year World Coconut Day at national level will be conducted at Indira Gandhi Krishi Vishwavidyalaya, Raipur on 2nd September. State level celebrations will also be arranged in major coconut growing states. Coconut day is an occasion to review policies and formulate future plans for this sector. It is also an occasion to find ways and means to make coconut sector a sustainable industry. Devoting one day to this crop have helped to record tangible improvement in creating awareness about the goodness of coconut, a perspective crop for future in the last 19 years. In this back ground let us appreciate APCC for taking the wise decision to celebrate World Coconut Day. On this occasion let us commit ourselves to eat coconut, drink coconut and use coconut for leading a healthy and wealthy life. ■

APCC response to vicious attack on coconut oil



Asian and Pacific Coconut Community

Jakarta - Indonesia

Statement from the Asian and Pacific Coconut Community (APCC) on the Claim that Coconut Oil is "Pure Poison"

Given during the 48th COCOTECH Conference, Bangkok, Thailand, August 22, 2018

Yesterday, a vicious attack on Coconut Oil was made by Dr. Karin Michels, Adjunct Professor of Epidemiology at the Harvard School of Public Health, where she claimed that it was "pure poison" and "one of the worst foods" that one can eat. The APCC, which represents 18 coconut-producing countries, refutes this statement as sensationalist, contrary to the truth, and damaging to the welfare of millions of people.

Today, Coconut Oil and Coconut are consumed by over 1 billion people and are the basis of the best cuisines in the world. Clearly, if Coconut Oil and the Coconut itself are "pure poison" as claimed, then the world's population would be at least 1 billion people less. The Coconut has a tradition dating back several thousands of years and is unique in being revered by many cultures as the "Tree of Life". Dr. Michels' claim is an insult to so many cultures.

There is no evidence that Coconut Oil consumption is linked to heart disease, inflammatory diseases and obesity (Kaunitz, 1970; Prior, 1981). In fact, recent studies have shown that Coconut Oil is healthy (Khaw, 2018). On the contrary, people who shifted from their traditional coconut diet have become obese (WHO, 2003).

On the other hand, it is the trans-fats from the Western diet that is the poison. Trans-fats have been estimated to have caused 30,000 premature deaths a year in the US (Ascherio, 1999) and is implicated in diabetes (Willett, 2006). It is the Dietary Guidelines for Americans that has been making the Americans obese since it was first published in 1980 (Cohen, 2015); this diet is making the rest of the world obese as well (WHO, 2018).

"Repeat a lie often enough and it becomes the truth", such is the practice of propagandists. This attack on Coconut Oil is an old lie that is once again being repeated.

The truth is that Coconut Oil is one of the healthiest oils in the world.

Finally, this irresponsible statement threatens the livelihood of millions of poor Coconut farmers. Dr. Michels should apologize and retract her statement.



URON N. SALUM
Executive Director

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Technology support for plant protection campaign in coconut

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Background

Coconut, the most important crop cultivated in Kerala state, occupies about 38% of the net area sown and plays a significant role in the agrarian economy of the state. However, owing to various socio-economic and other reasons productivity and income from coconut farming in the state is on the decline and coconut growers face a variety of challenges to make farming a remunerative enterprise. Crop loss due to incidence of pests and diseases is one of the major constraints experienced by coconut growers. Central Plantation Crops Research Institute (ICAR-CPCRI) has developed a number of viable technologies on palm health management amalgamating integrated pest and disease management with nutritional care of the palm. However, due to various reasons the field level adoption of technologies recommended for the integrated pest and disease management of coconut is very low and as such crop loss due to incidence of pests and diseases continues to incur huge economic loss for the coconut growers. One of the reasons attributed for the low level of adoption of integrated pest and disease management technologies is the lack of awareness/knowledge/skill about the recommended scientific practices. Hence, it is imperative that technology transfer initiatives are to be strengthened to empower coconut growers and other stakeholders with the relevant knowledge and skill for the effective management of technologies.

Crop loss due to pests and diseases in coconut

In Kerala, the annual crop loss due to pest

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Crop loss due to incidence of pests and diseases is one of the major constraints experienced by coconut growers. Central Plantation Crops Research Institute has developed a number of viable technologies on palm health management amalgamating integrated pest and disease management with nutritional care of the palm.

”

complex was estimated as 618.50 million nuts. Rhinoceros beetle (*Oryctes rhinoceros* L.), red palm weevil (*Rhynchophorus ferrugineus* Olivier), black headed caterpillar (*Opisina arenosella* Wlk.) and nut infesting eriophyid mite (*Aceria guerreronis* Keifer) are the major pests of coconut widely distributed in all coconut growing tracts of Kerala. White grub (*Leucopholis coneophora* Burm.) and coreid bug (*Paradasynus rostratus*) also cause considerable damage to coconut in localized areas. Root (wilt), leaf rot, bud rot and stem bleeding are the major diseases causing various degrees of crop losses throughout the state. The root (wilt), a slow debilitating disease of coconut is prevalent in all southern districts of Kerala in varying severity. The extent of incidence varied from 48.03% (Alappuzha) to 25.97% (Kollam) and

less than 10% (Thirissur and Thiruvananthapuram). Bud rot disease is mostly prevalent in the hilly terrains of northern districts. Stem bleeding disease is also wide spread in northern Kerala. In a study conducted by ICAR-CPCRI, it was revealed that the incidence of bud rot and stem bleeding disease in Kasaragod district was 2.38% and 2.27% respectively. In Kerala, major pest problems are prevalent in all the districts with varying intensities. It is estimated that 1% of the palms are attacked by red palm weevil every year in pest endemic zones of the state.

Studies by ICAR-CPCRI indicated that the incidence of rhinoceros beetle in coconut in Kasaragod district ranged from 3.03% to 21.67% and the district level overall incidence was assessed to be 8.46%. Eriophyid mite damage has been reported initially ranging from 50-70% during 1998, later surveys carried out in Alappuzha district during 2000 has shown an average loss of 30.94% in terms of copra and 41.74% in husk production. A crop decline extending up to 45% nut yield loss was reported from coconut black headed caterpillar-infested palms in succeeding year of severe pest infestation.

Impact of adoption of IPM/IDM practices in coconut—Experiences of CPCRI

The technical feasibility and economic viability of IPM/IDM technologies were successfully demonstrated in farmers' field at different localities under various action research projects implemented by ICAR-CPCRI ensuring active involvement of coconut farmers and other stakeholders. Root (wilt) disease management demonstrations undertaken by ICAR-CPCRI in farmers' plots recorded an average increase in yield of 32%. A front line demonstration programme implemented during 1999 – 2003 in an area of 25 ha of contiguously cultivated gardens comprising of 208 farmers with almost 5000 adult palms at Kayamkulam indicated improvement of average yield of coconut from 24 to 46 nuts per palm per year (91.4%). The B:C ratio improved from 1.03 to 1.77 proving the economic viability of root (wilt) disease management in coconut gardens. Due to the perennial nature of the crop, attitude of the farmers towards farming and other socio-economic constraints, the linear model of Transfer of Technology could not create the desirable impact. Hence, an



innovative Participatory Technology Transfer (PTT) approach was implemented in severely root (wilt) affected area of Alappuzha District. Impact analysis under this project indicated significant improvement in awareness (14 to 32.5%), knowledge (19 to 59.5%), attitude (22.5 to 36.5%) and adoption (16 to 45.5%) of various management practices. Due to project interventions, the yield improvement to the tune of 91% was achieved.

Integrated pest and disease management of coconut in five heavily root (wilt) disease affected districts of Kerala viz., Ernakulam, Kottayam, Pathanamthitta, Alappuzha and Kollam had improved the average yield of palms to 36 nuts per palm /year from 15 nuts/palm/year. Large scale field trials laid out in disease endemic areas of Kasaragod district during 2008 to 2010 by ICAR-CPCRI in 10 ha area comprising 1250 palms had shown about 75% reduction in bud rot incidence with the IDM package. CPCRI had further refined bud rot management strategies through biocontrol agents. Placement of Trichoderma coir pith cake (TCPC) was effectively demonstrated in farmers' plots. Application of TCPC to the crown of coconut palms @ two cakes per palm in the leaf axils adjacent to the spindle leaf just before the onset of south-west monsoon and thereafter at bimonthly interval till December was found to be very effective as a prophylactic treatment in the integrated management of bud rot disease without any other treatment. The disease incidence got reduced to 0 and 8.75% in Manjeswar and West Eleri panchayaths from the initial level of 7.3% and 20% respectively.

Community level technology convergence and large-area adoption of IPM technologies conducted in 2150 ha in Kerala (Bharanikavu, Cheppad), Tamil Nadu (Palladam), Andhra Pradesh (Ambajipet) and Karnataka (Bidramamandi) could reduce the pest incidence to 56.8%. Palms at early stage of infestation were completely recovered (80-85%) after curative treatment. Large scale demonstration of bio management of the pest conducted at Krishnapuram village (Alappuzha, Kerala) and Mogral Puthoor (Kasaragod, Kerala) in 2400 ha reduced *O. rhinoceros* damage on spear leaf and spathe by 95.8% and 62.5%. Area-wide technology adoption facilitated by ICAR-CPCRI covering 1500 ha in Alappuzha district

indicated 76 to 85% reduction in leaf damage by rhinoceros beetle over a period of three years with yield increase by 13.1% nuts per palm per year due to these interventions. Area-wide field validation of the biosuppression technology of coconut black headed caterpillar taken up by ICAR-CPCRI during 1999-2002 in different geographic locations in coastal Karnataka (Ullal and Jeppinamogru) and Coastal Kerala (Purakkad and Ayiramthengu) comprising a total of 1,400 ha could achieve 93-100 % reduction in *O. arenosella* population in a period of two years with regular monitoring and release of stage specific parasitoids viz., *G. nephantidis*, *B. brevicornis*, *E. nephantidis* and *B. nosatoi*. Farmer Field School (FFS) was found to be an ideal method for technology transfer in coconut health management system and the average knowledge score on pest management of those farmers attending FFS was 51.69 compared to 32.80 in case of non-FFS farmers.

Large scale demonstration of the IPM strategies for the management of rhinoceros beetle has attracted the attention of the farmers due to its feasibility. It has been realized that in the above demonstrations active involvement of the farming community was ensured through participatory mode approach. The participatory technology transfer (PTT) interventions were effective in terms of improvement in awareness and knowledge on symptoms of root (wilt) disease of coconut, knowledge on various items of the disease management components, attitude towards disease management and adoption of practices in terms of symbolic adoption scores. These factors are relevant in the sustainability of technology utilization along with policy implications including market and price levels of inputs and produces. Sustained surveillance, timely pest detection, sound awareness about the pest and perfect execution of curative management reduced the infestation level significantly. Saving approximately 1% of palms from the pest damage all over the state with complete recovery will be a huge economic turnover.

Scaling up of adoption of IPM/IDM technologies

Even though the technical feasibility and economic viability of IPM/IDM technologies were successfully demonstrated in farmers' field at different localities under various action research projects large scale uptake of such initiatives are limited. The farmer participatory approaches for effective implementation of plant protection interventions in coconut farming are being scaled

up by some of the agencies including local bodies through project modes. But the integration of efforts of various agencies involved in coconut development to improve and sustain the technological know-how among the coconut farming community has not been satisfactory. Further, the benefit of these efforts including that of the cluster programmes were confined to certain pockets and further spread of the technologies was limited. Sensitizing palm health management through plant protection campaign is the need of the hour in the context of dwindling farm size and manpower shortage. Correct diagnosis and timely adoption of pest management strategies improves health status of palms especially in root (wilt) disease prone districts of Kerala. Many times pest/disease detection is delayed and management deferred leading to death of palms causing tremendous crop loss. Technological interventions have become inevitable to bridge this gap and to address the challenges faced by the crop.

Project on technology support for plant protection campaign

Understanding key biotic constraints such coconut pests and diseases and adoption of management technologies through community approach and farmer-participatory strategies to address the issues need to be the main focus of any technology transfer initiative for crop protection in coconut. With this background, a project is being implemented by CPCRI with the financial support of State Department of Agriculture, Government of Kerala with an objective to strengthen the technology base and to extend the spread of technologies through creating opportunities for experiential learning, satellite model farms, farmer field schools and other participatory programmes by linking various research and extension programmes.

The project is aimed at developing and strengthening competent technology dissemination mechanisms involving various stakeholders engaged in coconut research, extension and farming through farmer participatory approaches for enhancing productivity of coconut in the state.

- Creating and developing district level partnerships and collaborative linkages with various agriculture development agencies of the state for streamlining the technology delivery of coconut pest and disease management
- To empower the extension officials, coconut farmers, farm women and rural youth through capacity

building at various levels to enhance technology utilization and dissemination.

- To promote community learning on Integrated Pest and Disease Management and preparation of bio-agents through farmer field schools / participatory programmes.
- To provide opportunities for the farmers and extension workers for experiential learning on package of IDPM technologies through satellite model farms, with special emphasis on eco-friendly/ bio-management strategies as well as fostering bio-resource management for crop protection

The project is implemented with the participation and involvement of all agencies involved in coconut research and development, which can act as a single window system for technology delivery at various levels. The satellite model farms will serve as the nucleus for agriculture development in the area by serving as a training centre for farmers, extension workers and students and as a demonstration farm for providing up-to-date information for the farming community around it. The project will also strengthen the capacities of the coconut farmers and motivate them for effective use of land and other resources through technology literacy programmes, experiential learning and linkage mechanisms, contributing to enhanced adoption of technologies. The competency of extension workers to perform the role of technology facilitation on crop based and allied enterprises will be enhanced through the experiential learning process. At the same time, this will enable the scientists to understand the appropriateness and level of performance of the recommended technologies under a given farming situation.

Area of Project:

Area of operation is state wide except Wayanad and Idukki districts. Under each district, one satellite model farm, four FFS / participatory demonstrations and other programmes like capacity development for extension workers, practicing farmers, farm women and rural youth, interface programmes, awareness campaigns, field days and exhibitions will be arranged. These activities will be arranged through the coordinated efforts of different agencies implementing the coconut development programmes in the districts based on requirements.

Mode of implementation:

Participatory observations through target group

discussions, meetings and interface programmes will be recorded on the local problems faced by the coconut farmers, their knowledge and adoption levels of technologies, technology transfer strategies, feedbacks related to technologies and programmes as well as other socio-economic constraints. Capacity development programmes for improving the managerial and technological efficiency of extension workers, practicing farmers, farm women and rural youth are proposed. Training programmes required under various development programmes will be given priority. Farmer field schools and satellite model farms for facilitating experiential learning by the farmers and extension workers will be introduced in selected communities / holdings, where innovators and early adopters will be selected for effective implementation. These will serve as model units for showcasing the technologies for replication. Technology campaigns and field days will be organized for creating public awareness. Pre & Post project situation including improvements in productivity, level of incidence of pests and diseases and socio-economic status of the communities will be documented as indicators of impact assessment.

Information, Education and Communication (IEC) activities

- Capacity Development programmes for strengthening technical and managerial capacities
Extension officials / Project Assistants
Practicing coconut farmers/ communities
Farm women groups and rural youth
- Farmer Field Schools (FFS) and participatory demonstrations for learning through observation and experimentation
- Satellite Model Farms Approach (SMFA) for promoting integrated land use at farm level through experiential learning.
- Interface programmes with people's representatives, mass media etc for information sharing
- Public awareness creation through mass media, exhibition and cyber extension
- Technology campaigns/field days
Comprehensive package of coconut technologies for satellite model farms
Production technologies for improving the productivity in root (wilt) affected areas
- Nutritional management involving biomass

recycling, basin management – green manures, other organic manures, bio-fertilizers & balanced application of fertilizers

- Irrigation, Moisture conservation and water harvesting techniques
- Appropriate cropping system models involving diversification of crops and enterprises.
- Mixed and inter cropping
- Production of coir pith compost / vermicompost
Protection technologies
Leaf rot management – IDM involving fungicides and bio-agents
- Control of rhinoceros beetle – IPM involving bio-agents, leaf axil filling using botanical /biorational molecules
- Control of red palm weevil – IPM involving phytosanitation and chemical treatment
- Management of Coconut eriophyid mite- package

involving botanical pesticides and nutritional management

- Management of other diseases & pests
- Production of bio-agents and utilization

Conclusion

Various interventions including training programmes on various aspects of plant protection in coconut to benefit farmers, extension personnel, rural youth and women, front line demonstration of IPM/IDM technologies, selection of coconut holdings and development of satellite model farms etc. have been implemented in different localities of the state under the project on technology support for plant protection campaign in coconut. Implementation of different interventions under the project will strengthen the technology transfer initiatives for crop protection in coconut in Kerala state, which in turn can substantially contribute for the sustainable development of coconut sector in the state. ■

Advertisement Tariff of Coconut Journals

Indian Coconut Journal (English monthly), Indian Naliker Journal (Malayalam monthly), Bharatiya Nariyal Patrika (Hindi quarterly), Bharatiya Thengu Patrike (Kannada quarterly) and Indhia Thennai Idazh (Tamil quarterly) are the periodicals of the Coconut Development Board. These journals regularly feature popular articles on scientific cultivation and other aspects of coconut industry. The journals are subscribed by farmers, researchers, policy makers, industrialists, traders, libraries, etc.



Position	Indian Coconut Journal (English monthly) (Rs.)	Indian Naliker Journal (Malayalam monthly) (Rs.)	Indhia Thennai Idazh (Tamil quarterly) (Rs.)	Bharatiya Nariyal Patrika (Marathi Bi-annual) (Rs.)	Bharatiya Kobbari Patrika (Telugu Bi-annual) (Rs.)	Bharatiya Thengu Patrike (Kannada quarterly) (Rs.)	Bharatiya Nariyal Patrika (Hindi quarterly) (Rs.)
Full page - B & W	No B&W pages	No B&W pages	5000	5000	5000	5000	No B&W pages
Full page - Colour	20000	20000	10000	10000	10000	10000	5000
Half page - B & W	No B&W pages	No B&W pages	3000	3000	3000	3000	No B&W pages
Quarter page - B & W	No B&W pages	No B&W pages	1500	1500	1500	1500	No B&W pages
Back inner cover - Colour	25000	25000	10000	10000	10000	10000	8000
Back cover - (Colour)	30000	30000	15000	15000	15000	15000	10000

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Kosi zone of Bihar – Potential area for coconut

Ruby Rani, H. P. Maheswarappa and N. R. Dhathri

AICR on Palms, Sabour, Bihar Agricultural University -813 210, Bihar

Agriculture is the core of Bihar's economy, employing 77% of the workforce and generating 35% of the state domestic product. With 88 % of the state's poor living in rural areas, improving agricultural performance and related rural non-farm activity is critical for improving the livelihood and reducing poverty. Coconut is a traditional plantation crop of India and assumes the status of a high value commercial crop and coconut gardens offer excellent opportunities to exploit the inter-space potential for maximizing returns per unit area. Sustainability is the main objective of farming system, where production process is optimized through efficient utilization of the inputs in safeguarding the environment.

Suitability of Bihar for coconut cultivation

The state of Bihar is a land-locked state situated on the eastern part of India. It is situated between 83°-31' to 88°-00' E longitude and 21°-58' to 27°-31' N latitude. The climate of Bihar is mostly semi-arid, sub-tropical, experiences moderate rainfall, hot summer and cold winter. Nevertheless, this region being close to Tropic of Cancer experiences tropical climate during summer. Average maximum temperature is 35°-40°C throughout the summer months and the average minimum temperature during the coldest month of December and January goes down to 5° to 10°C. Bihar gets its maximum rainfall during South-West monsoon season which prevails from June to September. The natural precipitation ranges between 990 mm and 1700 mm, with an average annual rainfall at 1205mm. Thus the climate of Bihar is not much suited for the cultivation of all plantation crops, even though the



Fig. 1 Agroclimatic zones of Bihar

crops like coconut, betel vine and tea are successfully grown in some of the pockets of the state. Plantation crop requires a moderate climate with respect to temperature with high humidity and do not thrive well under extremes of climate. An average temperature of about 25°-35°C and humidity above 60 per cent is ideal for most of the plantation crops. It requires less variation in diurnal temperature and well-distributed rainfall throughout the year.

Based on soil characterization, rainfall, temperature and terrain, three main agro-climatic zones in Bihar have been identified. These are: Zone – I (North West Alluvial Plain), Zone – II (North East Alluvial Plain), and Zone-III (South Bihar Alluvial Plain). The climate of Zone II commonly known as Kosi zone consisting of the districts like Kishanganj, Araria, Purnea, Katihar, Eastern part of Madhepura, Saharsa, and some parts of Bhagalpur covers 11.96% (20797.4 km²) of the total geographical area of Bihar



Coconut based cropping system in Bihar



Nursery at CDB, Madhepura farm

has been found to be suitable for coconut cultivation (See Fig-1). The zone experiences an average minimum temperature of 8.8°C and maximum temperature of 33.8°C. This zone has a network of rivers like Bagmati, Kosi and other small rivers, thus humidity is quite high as compared to other areas of the state.

Potential area of coconut cultivation in Bihar

The area of coconut in the state is about 14090 ha with an annual production of 141 million nuts (Database, 2016-17, CDB). Coconut planted in these areas is mostly of tall type and most of the plantations are stray backyard or bund plantation. However few orchards in Katihar and Purnea districts have also been established. The soil under the influence of these areas is mostly new alluvium, non- calcareous and non-alkaline soil. The districts in Zone II have the potential for coconut and hence effort should be made for further expanding area under coconut cultivation in this zone.

Status analysis of coconut in Bihar state:

Following SWOT analysis has been carried out with regard to coconut in Bihar

A. STRENGTHS:

1. High demand for coconut:

- There is much scope of coconut in Bihar especially in some of the districts where in suitable weather condition exists, the crop can be exploited at a commercial level.

- Demand is very high for tender coconut during the months from March to August and for matured nuts demand is very high during Dussehra and Chchath Puja in the month of October- November.

2. Suitable climate in some of the districts:

- The climate of Zone II commonly known as Kosi zone consisting of the districts like Kisanganj, Araria, Purnea, Katihar, Eastern part of Madhepura, Saharsa, and some parts of Bhagalpur has been found to be suitable for coconut cultivation.

3. Suitable for bund planting:

- Coconut can be planted on bunds of the field crops in the suitable area for getting additional income.

4. Demonstration cum Seed Production (DSP) Farm:

One of the Centre of Coconut Development Board (CDB), a statutory body established under the Ministry of Agriculture and Farmers Welfare, Government of India has established a Demonstration cum Seed Production (DSP) Farm in Bihar at Madhepura with the following thrust area:

- Increasing the production of quality planting material.
- Creating future production potential by bringing more area under coconut.
- Improving the productivity of existing coconut holdings.
- Integrated management of major pests and diseases.
- Strengthening coconut industry by promoting product diversification and by-product utilization.



High yielding germplasm

Hence proper policy should be made for optimum utilization of facilities and bringing additional area under coconut cultivation the suitable region.

B. WEAKNESSES

1. Lack of awareness about health benefits and potential of coconut.

2. Lack of awareness on coconut production technology:

- People are not much aware of the technology know how for successful cultivation of coconut even the area where coconut can be grown successfully.

3. Lack of recommended suitable varieties:

- There are no recommended varieties for this region. Experiments are under progress to identify the suitable variety of coconut under AICRP on Palms (Coconut) and Sabour centre to identify the varieties suitable for this region.

4. The agronomic and plant protection practices for the crop demands special type of skilled labour.

C. OPPORTUNITY

1. Suitability of different genotypes:

- During a survey of the coconut growing area under the state, it was found that different types of germplasm exists with good nut yield.

Following genotypes have been noticed during the survey and seednuts have been collected for further multiplication.

2. Scope of multi-storey cropping system:

- On knowing the success of multi-storied cropping system in other parts of India, coconut based high density multispecies cropping system model was established under AICRP, Palms which aims at developing a system which is self-sustaining and produces maximum biomass and returns with least inputs.

Coconut + Guava + Banana + Turmeric + Elephant Foot Yam+ Cowpea +Pea + Mustard (integrated cropping system can be followed for Bihar region)

3. Exploitation of value added products for improvement of human health and wellness

4. Involvement of community level approach for augmenting farm income

5. Favourable policy environment for production and marketing of neera and coconut sugar

6. Alternative utilization of wood for furniture and support for handicrafts artisans

D. THREATS:

- Lack of interest among the farmers for growing coconut as it is not a commercial crop in Bihar.
- Coconut was not included in the priority list of state government.
- Unavailability of quality planting material.
- Climate change and deteriorating natural resources in crop growing areas and consequent drought and high temperature affecting cultivation
- Chilling injury occurs in tropical species at temperatures above freezing and occasionally as high as 50°F.
- Possibility of frequent price shocks due to the change in demand supply chain.

Achievements of AICRP on Palms, Sabour centre:

The centre is working since from 2009 in the state for the promotion of coconut in Bihar; however many more efforts are needed to be taken up in order to educate the growers regarding the scientific method of cultivation practices, its care and maintenance of coconut.

- Manuring before winter i.e., in September-October and water sprinkling during morning and evening hours reduces frost injury in coconut seedlings.



Independence day

2018

Dr. Raju Narayana Swamy IAS, Chairman, Coconut Development Board hoisting the National Flag at CDB Headquarters premises on 15th August 2018. Shri. Saradindu das, Chief Coconut Development Officer, Shri. R. Madhu, Secretary and other Officers and staff of the Board are seen.



Seedlings protected from frost damage

Frost damage

An experiment conducted at Bihar Agricultural University, Sabour under All India Coordinated Research Project on Palms revealed that crops like guava, banana, Turmeric, elephant foot yam, cowpea, pea, mustard, cucurbits and amaranth are considered as suitable intercrops in coconut garden. Besides, commercial flowers like marigold, tuberose, gerbera and gladiolus has also been found suitable intercrop in order to get a high return from coconut garden in other parts of the country.

For managing bud rot disease, the package developed by CPCRI is being adopted.

Bihar belongs to non traditional coconut cultivated area and special focus is being given for development of coconut sector in the state. Kosi region in North East Bihar which comprises places on either sides of the Kosi River is suitable for coconut cultivation. Hence there is much scope for area expansion of coconut and need to promote this crop by creating awareness among the farmers and by providing technology. ■

- Pomegranate should not be planted as intercrop in coconut based cropping system in Bihar region.
- Seedlings planted should be protected from frost during winter by covering it with transparent polythene sheets and proper shading should be provided to protect the young seedlings during summer.

New Distributional Record of Rugose Spiralling Whitefly on Coconut in Kamrup and Nalbari districts of Assam

Chandrika Mohan*, Josephraj Kumar A.* Singh, L.S and Alpana Das **

*ICAR-CPCRI, Regional Station, Kayamkulam and

**ICAR-CPCRI, Research Centre, Kahikuchi

Rugose spiralling whitefly (RSW), *Aleurodicus rugioperculatus* Martin is the latest invasive pest reported on coconut palms from Pollachi, Tamil Nadu and Palakkad, Kerala during 2016. The pest could have been accidentally introduced from Florida, USA mainly by import of ornamental and other economic palms from the region. *A. rugioperculatus* established swiftly in Peninsular India (Kerala, Tamil Nadu, Andhra Pradesh, Karnataka and Goa) predominantly on coconut palms and to some extent on banana as well. De-sapping from under surface of palm leaflets, *A. rugioperculatus* resulted in exudation of tremendous quantum of honey dew and over which the extensive development of sooty mould (*Leptoxiphium* sp.) could appear on the upper leaf surface of palms. As part of awareness campaign, ICAR-CPCRI has alerted all coconut growing regions in the country as well as stakeholders about the invasive pest through the “National Workshop on the Bio-suppression of Rugose Spiralling Whitefly” held at Kasaragod in January, 2018. The resolution emerged and the message disseminated is about the pesticide holiday envisaged in the management of RSW which included conservatory biological control using the aphelinid parasitoid, *Encarsia guadeloupeae* as well as habitat preservation of the sooty mould feeding Leiochrinid beetle, *Leiochrinus nilgiranus* (Chandrika Mohan *et al.*, 2017; Josephraj Kumar *et al.*, 2018).

Surveillance survey

In this context, widespread distribution of the rugose spiralling whitefly, *A. rugioperculatus* was observed on coconut palms in different hamlets of Kamrup and Nalbari districts of Assam in August 2018.



RSW damaged palm in Assam



Spiralling pattern of egg laying

In the surveillance survey organized by ICAR-CPCRI, a new distributional report of the pest in North-East region (Assam) on coconut palms and to a limited extent on the arecanut, ornamental yellow palms, banana and certain croton species (*Codeum*



Egg colony on under surface of leaflet

variegatum) could be highlighted. Few farmers have reported its occurrence on betel vine as well. Occurrence of RSW in different hamlets of Kamrup and Nalbari districts is presented in Table 1.

Table 1. Prevalence of rugose spiralling whitefly on coconut palms in Assam		
District	Hamlets	Intensity of infestation
Kamrup	Damdama	+++
	Hajo (Bishnupur, Bordudi)	+++
	Kalitakuchi	++
	Nahira, Rampur	-
	Holongjuli	-
Nalbari	Bijulighat	++
	Barkuriha	++
	Madhapur	++
	Katpua	++
	Tilana	+

Intensity of infestation ranges from – (zero), + (1-5 live egg colony per leaflet), ++ (5-10 live egg colony per leaflet), +++ (> 10 live egg colony per leaflet)

Based on the survey analysis and discussion made with the farmers during the snap survey programme, the pest damage symptoms were observed at least eight months back in the region especially in Nalbari district, where the pest incidence is at the receding phase in many gardens at this point of time. Natural parasitism by the aphelinid parasitoid, *Encarsia*

guadeloupae was also observed in Nalbari district on the nymphs of *A. rugioperculatus* with tremendous dissolution of colonies and blackening of RSW nymphs. Observation of RSW revealed 82.1% natural parasitism by *E. guadeloupae* in samples collected from Nalbari and Kamrup districts. Pest reduction is mainly accomplished in areas with higher level of parasitism by *E. guadeloupae*. In addition, it was also observed in the neuropteran predator green lacewing fly, *Dichochrysa astur* in Madhapur, Nalbari district where the pest population is significantly reducing. More than 65% of fronds were found affected in the pest affected palms with intensity of infestation exceeding more than 15 live egg colonies per leaflet.

Significant deposition of sooty mould on the upper surface of palm leaflets is quite visible impairing photosynthesis and this forms the characteristic symptom of pest attack. Some farmers of the region are of the opinion that the fumes from the plastic industry nearly could be responsible for the blackening of palms. Furthermore, enhanced senescence of older palm leaflets could be observed with no death of the palm recorded in any of the region under surveillance. The pest damage could be observed visibly on tall palms along the roadside in Damdama, Hajo and Kalitakuchi regions of Kamrup district as well as in Bijulighat, Barkuriha, Madhapur, Katpua regions of Nalbari district (Table 1). RSW incidence is quite prominent along the Highway road side and is reduced considerably on coconut palms in the interior region away from the Highway side thereby indicating the spread of the pest mainly localized along the vehicular movement zones carrying the infested materials.



Establishment of released sooty mould feeding Leiochrinid beetles in Assam



Awareness meeting at Tilana



Distribution and release of sooty mould feeding beetle in Assam

Awareness campaign

In order to highlight the true cause of blackening of coconut palms in the region, an awareness meeting was organized at Tilana, Mugkuchi, Nalbari district, Assam by scientists of ICAR-CPCRI on 14th August 2018 and explained about the blackening of palm leaflets by RSW infestation and not by other means. The bio-suppression strategies of rugose spiralling whitefly included pesticide holiday, effective sensitization on the bio-suppression of the RSW by the aphelinid parasitoid, *E. guadeloupae* and bio-scavenging of infested palms by introductory release of the sooty mould feeding beetle, *L. nilgirianus* as well as distribution of pest free coconut seedlings were emphasized.

To combat the pest incidence, augmentative biological control by releasing palm leaflets (10 cm) containing the *E. guadeloupae*-parasitized RSW pupae as well as the classical bio-scavenging programme by introducing sooty mould feeding Leiochrinid beetle, *L. nilgirianus* was undertaken in all pest affected hamlets. These beneficial insects were brought from Kayamkulam, Kerala as part of the classical biological control and bio-scavenging programme initiated for the first time in coconut sector to ingress the rugose spiralling whitefly attack in an eco-friendly manner. Overwhelming response was received in the release programme fostered by active support by participating farmers in all points of release in Kamrup and Nalbari districts, Assam.

Epilogue

As part of arresting the spread of RSW in different parts of Assam, strict quarantine should be ensured

in the transport of coconut seedlings from one place to other in the North-East region. Coconut seedlings should be absolutely free from RSW during distribution to farmers which should be strictly enforced in this sensitive zone. The introductory conservatory biological control as well as the classical bio-scavenging programme initiated by ICAR-CPCRI by release of *E. guadeloupae* and *L. nilgirianus* should be protected for successful establishment and reducing the population of RSW in the region. The enthusiastic response from the farming community could be utilized by area-wide release of the beneficial insects subsequently for effective suppression of the rugose spiralling whitefly. To conclude, awareness campaign should be further strengthened by all stakeholders for effective reach out of pesticide holiday approach in the bio-suppression of rugose spiralling whitefly in the North-East region.

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Intercropping in Coconut for Higher Returns

Success story from Thanjavur district of Tamil Nadu

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Coconut plays a pivotal role in the agrarian economy of many states in India and it is predominantly a small and marginal holder's crop. As the availability of land for extending the area under coconut is increasingly difficult, the imperative need to increase the productivity of the garden is evident. Coconut based cropping system enable farmers of small holdings to diversify their crops thereby reducing the risk of crop failure or price fluctuations, to intensify the use of their land to maintain soil fertility, to gain more cash income and meet varied requirements of their family. Tamil Nadu state is one of the largest and leading producers of coconut in India, while Thanjavur wilt disease is a major constraint in the production of coconut. This disease in Tamil Nadu is threatening the coconut industry not only in Tamil Nadu but also in the neighbouring states. The disease is widespread in all parts of Tamil Nadu and also in the adjoining states of Andhra Pradesh, Karnataka and Kerala. Under the All India Co-ordinated Research Project on Palms, the

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centres at Veppankulam, conducted many cultural, manurial and chemical trials for the past few years with a view to controlling or managing the Thanjavur wilt/ Ganoderma root rot. Technologies have been evolved and more awareness programmes and



Cocoa and Coconut intercrop field



Vegetable intercropped field

demonstrations are being carried out among the coconut growing farmers to mitigate the problem by wilt disease and give guidance to improve the productivity of the coconut. Diversified cropping system could be one of the solution to realize sustainable productivity and maximum income per unit area of land besides maintaining soil fertility by the recycling of by-products of crops since land being a renewable resource, must be put to maximum use for increased crop production. Better space utilization was understood by the coconut farmers in the coconut based cropping system (CBCS) which not only helps in space utilization but have also known about the complementary effects of intercrops in coconut gardens. It is one of the most appropriate system, which can be easily adopted by the coconut growers. Banana, black pepper, cocoa and vegetables are the suitable intercrops for the East coast region of Tamil Nadu. The farmers grow cocoa as one of the best intercrop in their coconut plantations and generate a profitable income with an average price of Rs. 150 – 200/- per kg of dried cocoa beans. Apart from this, coconut and cocoa crops has a buy-back system and assured market in the country. Here is the success story of a farmer from Thanjavur district who has adopted the cocoa as intercrop in coconut .

Mr.S.Dhanapal, S/o Mr.Somu of Silambavelankadu village, Pattukkottaitaluk, Thanjavur district has set himself as a role model for the cash-strapped farmers in the state, thanks to the synergistic integration of enterprises and optimum resource. However, support from CRS, Veppankulam, helped him to go for coconut based cropping system that enhanced productivity and profitatbility in relation

to the farming system. In spite of the discouragement of neighbouring farmers, he started intercropping of cocoa in his coconut garden during 2004 and at present he is happy with the performance and returns. He could get the information on pruning and training of cocoa through scientists of CPCRI and maintained the crop with recommended package of practice. After 5 to 6 years, gradually he noticed that the soil erosion was arrested and enhancement of soil fertility build up due to higher biomass generation from the system over time. According to him there was also reduced weed growth due to the smothering effects of intercrops and non exposure of soil to sun light. Due to more addition of organic matter into the soil, the microbial load and earth worm population also increased. In later days he observed that the incidence of disease also reduced and the loss of palms by wilt was almost negligible. It is found that cocoa is a remunerative crop as the cost of production is less compared to other crops. Even during the price crash of coconut, it served as insurance for his family. Ten to twelve years of his experience indicated that, the coconut nut yield in the intercropped garden is 135-150 nuts/palm/year compared to 110-115nuts/palm/year in monocropping system. The net income obtained by coconut + cocoa intercropping is around Rs. 3 to 3.25 lakhs/ha/year whereas it was Rs1.75 to 2.0 lakhs ha/year in coconut monocrop depending upon the market price (2016-18 basis). Thus there was an additional income of Rs. 1.25 lakhs/ha/year due to intercropping cocoa and improvement in the soil health and reduction in the Ganoderma incidence. In addition to this he is growing bitter gourd and snake gourd in 250 sq. ft area in juvenile coconut garden and earns around Rs. 20,500/- per annum.

Growing of intercrops in coconut grdens produces more food and agricultural products, ensuring food security of the people in rural and urban areas. At the same time, the practice generates employment opportunities and livelihood, enhancing farm income and the purchasing power of people, thus alleviating poverty in farming communities. Moreover, successful farmers serve as inspiration and enterprise leaders in their communities, eventually treating coconut farming in an agribusiness way to create wealth and more capital resources.

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CDB to deliver Rs. 193 crore worth schemes during 2018-19

Kumaravel S, Development Officer, CDB, Kochi - 11



India is the global leader in coconut production and productivity. As per the latest statistics of Ministry of Agriculture and Farmers Welfare, coconut provisionally occupies a total area of 20.99 lakh ha. with a production of 24.38 crore nuts. The productivity averages at 11616 nuts per ha. The coconut palm provides food security and livelihood opportunities to more than 12 million people in India. It is also a fiber-yielding crop for more than 15,000 coir based industries which provides employment to nearly six lakh workers of which 80 per cent are women folk.

Coconut Development Board (CDB) is a statutory body established by Government of India by an Act of Parliament (Coconut Development Board Act, 1979) and came in to existence in January 1981, for the integrated development of coconut cultivation and industry in the country with focus on productivity increase and product diversification. The promotion and development of coir industry as well as export market of coir and coir products in India as a whole are being taken up by the Coir Board, which is a statutory body established by the Government of India under a legislation enacted by the Parliament namely Coir Industry Act 1953 (45 of 1953).

With a view to make the country's coconut economy sustainable & globally competitive, CDB undertakes implementation of various programmes and activities in the following thrust areas: production and distribution of quality planting material, expansion of area under coconut cultivation especially in potential and non-traditional areas, improving the productivity of coconut in major coconut producing states, developing technology in post-harvest processing and marketing activities, product diversification and by-product utilization of coconut for value addition and dissemination of information and capacity building in coconut sector.

Coconut is cultivated in 17 States and 4 Union Territories in different agro-ecological zones in the country. The Board is undertaking various schemes on the above thrust areas in these States and UTs in association with the State Departments, Farmer Producer Organizations, State Agricultural Universities, KVVKs, other Line Departments and reputed agencies. In case of non coconut growing States, the Board is implementing schemes and other activities related to market promotion, publicity and processing for value addition also by participating in exhibitions & fairs, organizing buyer seller meets,



publicity activities, projects for processing coconut and its products, etc.

CDB functions under the Ministry of Agriculture and Farmers Welfare and receives 100 % central assistance as a sub-scheme under the Centrally Sponsored Scheme on Green Revolution - Krishionnati Yojana – Mission for Integrated Development of Horticulture (MIDH). It may be noted that during the year 2017-18, a total expenditure of Rs. 189.46 crore has been made by the Board under different programmes and activities against the budget allocation of Rs. 196 crore.

For the year 2018-19, CDB is allocated with a tentative budget of Rs. 193 crore. Discussions at various levels have been held with the concerned State Departments, Members and Officers of the Board, Ministry of Agriculture and Farmers Welfare and the action plan for 2018-19 for a total budget of Rs. 193 crore has been finalized and is under implementation. The financial subsidy is shared from 25 to 100 % under different schemes, where 25 or 50 % is met by the State Government. The salient features of the major activities proposed for 2018-19 are briefed below.

Enhancing the production of coconut will certainly increase the trade related activities at various levels of processing for value addition and marketing apart from providing increased livelihood opportunities for the people involved at different stages.

Production and distribution of quality planting materials

Enhancing the production and supply of good coconut seedlings will certainly lead to increased production. A total budget allocation of Rs. 5.83 crore has been made for the same through the following component programmes.

1.a. Establishment of Demonstration cum Seed Production (DSP) Farms:

The Board has established 11 DSP Farms in different coconut growing states, including the recently taken over 50 ha land in West Bengal, for creating infrastructure facilities for production of quality planting materials besides demonstrating and educating scientific coconut cultivation and processing to various stake holders in those regions. The farms are planted with different varieties of coconut palms and suitable intercrops. Seednut/seedling production of different varieties and hybrids are also being undertaken in the farms which are in different stages of establishment. A total provision of Rs. 3.00 crore is made during the year under this component.

1.b. A physical target of production of 15 lakh quality coconut seedlings (10 lakh by States and 5 lakh by DSP Farms the Board) is envisaged under the component programme 'Establishment of Regional Coconut Nurseries' with a central assistance of Rs. 2.40 crore. To supplement the coconut nursery programmes of the State Governments, support is extended to the participating States for strengthening the seedling production programme of the States concerned by establishing Regional Coconut Nurseries by way of financial assistance on 50:50 basis. Support is also extended to the commercial nurseries attached to all DSP Farms of the Board for the production and supply of quality coconut seedlings of released varieties/ hybrids.

1.c. Establishment of Nucleus Coconut Seed Garden:

The scheme is implemented on project basis to establish nucleus seed garden of selected cultivars in the private sector and Govt./Quasi Govt. to meet the future demand of quality coconut seedlings.

Individual farmers, Cooperative Societies, NGOs, KVKs and other Government/ Quasi Government organizations having suitable land to establish the seed garden are eligible for availing financial assistance under this programme. Financial assistance in the form of back ended credit linked subsidy @ 25% of the total expenditure incurred limited to a maximum of Rs.6.00 lakh will be extended by the Board for maximum of 4 ha over a period of 3 years. An allocation of Rs. 0.29 crore has been made under this component for 2018-19.

1.d. Establishment of Small Coconut Nursery:

The scheme is implemented on project basis to encourage private sector and other agencies in seedlings production by providing financial assistance for establishing coconut nurseries. Financial assistance is 100% of the cost limited to Rs.2.00 lakh per unit of 0.4 ha (100% of the cost of seed nut and transport, maintenance of nursery, other infrastructure facilities etc.) for production of 25,000 certified coconut seedlings annually. The subsidy is released on pro-rata basis from minimum production of 6250 certified seedlings annually. Rs. 0.14 crore is earmarked for this programme for the current year.

2. Expansion of Area under Coconut

The objective of the programme is to extend adequate technical and financial support to the farmers to take up coconut cultivation on scientific lines in potential areas to attain a significant achievement in the future production potential. In Normal area, subsidy will be Rs. 6,500/-, Rs. 6,750/- and Rs. 7,500/- per ha for Tall, Hybrid and Dwarf varieties, respectively, in two equal installments over a period of 2 years. In Hilly and Scheduled areas, differential cost norm of Rs.13750/-, Rs.13750/- and Rs.15000/- per ha, respectively is followed. Implementation of the programme with higher cost norms for block plantations is also under consideration by the Board. For 2018-19, a total provision of Rs. 4.56 crore is made in the budget under this programme.

3. With the objective of improving productivity, thereby the production, of the coconut holdings through an integrated approach and increasing the net income from unit holdings, the scheme 'Integrated Farming for Productivity Improvement' is implemented with the following component programmes:

3.a. Laying out of Demonstration Plots: To

encourage the farmers to adopt the technologies developed for the management of coconut gardens including intercropping. These demonstration plots will also help motivating farmers in adoption of result oriented production technologies. Financial assistance of Rs. 35,000/- per hectare in two annual installments is provided under this scheme, for which a total allocation of Rs. 69.35 crore has been earmarked during 2018-19.

3.b. To promote the use of organic manures like vermicompost, coir pith compost, etc. in coconut holdings, financial assistance to a maximum of Rs. 60,000/- per unit is extended for 'establishing organic manure units' in coconut gardens. During the current financial year, a budget provision of Rs. 1.05 crore is made under this scheme.

4. Replanting and Rejuvenation of Coconut Gardens

The objective of the scheme is to enhance the productivity and production of coconut by removal of disease advanced, unproductive, old and senile palms and rejuvenating the remaining palms. The scheme is implemented on project basis based on State specific problems. Financial assistance to a maximum of Rs. 53,500 /- per ha is extended under this programme. For the year 2018-19, Rs. 39.51 crore has been allocated for this programme to be implemented in 13 States.



5. To provide insurance coverage to healthy, bearing palms in the age group of 4 to 60 years against natural perils leading to death/ loss of palm becoming unproductive 75 % premium subsidy is extended by the Board (50 %) and State Govt. (25%) to the coconut farmers under the 'Coconut Palm Insurance Scheme'. The premium for palms of 4-15 year age group is Rs. 9/- per palm and that for 16-60 year is Rs. 14/- and the insured amount is Rs. 900/- and Rs. 1750/-, respectively. Rs. 1.05 crore is earmarked by the Board in the budget for the year 2018-19.

6. Kera Suraksha Insurance Scheme provides insurance coverage to coconut tree climbers (CTC) @ Rs. 2 lakh against 24 hours against accident related risk including death. The annual premium for the policy is Rs.94.40 per climber of which Rs. 71.40 is borne by the Board and Rs. 23 is contributed by the CTC. The scheme is allocated with a budget of Rs. 0.05 crore during the current financial year.

7. Under 'Technology Mission on Coconut', back-ended credit capital subsidy to a maximum of Rs. 50 lakh limited to 25% of the cost is extended. For SC/ST women farmers, 33.3% of the project cost and in case of high value agriculture in the UTs of Andaman & Nicobar Islands and Lakshadweep, 50% of the project cost is extended. The Mission is implemented with the objectives of (a) development of technology for new value added coconut products and by-products by research, bring these value added products to commercial production by assisting promising entrepreneurs (b) providing assistance for control of specific disease/ pest in any specific area including development of technology for controlling them to ensure undisrupted supply of raw materials to the coconut industry for production of value added products and by products (c) development and promoting market for such newly developed value-added products and by-products including traditional products (ball copra, copra and oil) by research, surveys and brand promotion. The implementation of this scheme is on time bound project basis.

8. Marketing, Market intelligence Services, Statistics and strengthening of Export promotion Council (EPC):

The Board undertakes market promotion activities for the development of the coconut sector in the country with major activities like Market Promotion, Market Intelligence, Market Research, Market Development, facilitating formation of FPOs in coconut sector, statistical surveys and evaluations, performing the responsibilities of Export Promotion Council for Coconut and other enabling policies. Organizing buyer-seller meets, financial assistance for setting up of coconut kiosks, extending assistance to entrepreneurs including Coconut Producers' Companies to participate in domestic trade fairs / expos; Exporters to participate in international exhibitions, trade fairs, buyer seller meets, awards for export excellence are envisaged for the current financial year.

To encourage processing and marketing, the allocations under TMoC and Marketing have been increased to Rs. 17.00 crore and Rs. 4.00 crore during 2018-19, respectively from Rs. 14.00 lakh and Rs. 2.00 lakh during 2017-18.

9. The Board has several programmes under 'Information and Information Technology' and HRD with a view to disseminate information on various aspects of coconut cultivation and industry through various media publications, product promotional campaigns, organizing/ participating in major exhibitions & fairs, etc. besides organizing training programmes to impart skills and knowledge to farmers, unemployed youths and rural women in various fields viz., Friends of Coconut Tree, Neera Technician, Handicraft training related to coconut and preparation of coconut based convenience foods, etc. For recognizing outstanding performance in coconut sector a scheme of National Awards is also being implemented biennially. As part of creating awareness across the country on coconut production, post harvest technology and value





addition in coconut, the Board organizes awareness cum training programmes at State, District and Block levels. The Board has also earmarked Rs. 0.47 crore for distribution of 87000 coconut seedlings in 21 aspirational districts in 9 States as part for Krishi Kalyan Abhiyan Scheme of the Ministry of Agriculture and Farmers Welfare under the Aspirational Districts Programme. Altogether, the allocation under these activities for the year 2018-19 is Rs. 10.00 crore including Rs. 1.75 crore for skill development activities.

10. The Board is having CDB Institute of Technology in Kerala for which a total budget of Rs. 0.61 crore has been allocated for the year 2018-19 under the scheme 'Technology Development and Quality Testing Laboratory'. The Institute is engaged in development and demonstration of technologies for product diversification and by-product utilization of coconut. Interested entrepreneurs and Self Help Groups are given training for acquiring technologies on post harvest coconut processing and process demonstration. A full-fledged NABL accredited Quality Testing Laboratory is also operating in the Institute with advanced analytical instruments and modern facilities for chemical and microbial analysis of coconut based products.

11. Funds to a tune of Rs. 37.00 crore and Rs. 3.00 crore have also been earmarked for 2018-19 towards the 'Infrastructure, Administration, Technical Services and Project management' and 'Establishment of Centre of Excellence for Coconut', respectively.

The role of research institutions and State Agricultural Universities in developing new high yielding, biotic/abiotic stress resistant varieties, preservation and value addition; role of Government agencies like Ministry of Agriculture & Farmers Welfare, Coconut Development Board, other central & State government agencies, extension agencies in technology dissemination, reaching the developmental programmes to the needed, making necessary changes in the policies; and the role of farmers and entrepreneurs as the proactive end users to adopt the technologies and their action in collective manner are the strengths of the country that could bring the crop to a better status compared to last decade. Decrease in availability of agricultural land, fragmentation of agricultural lands, climatic vagaries, uncertainty in availability of manpower for farm operations, escalation in cost of cultivation coupled with price fluctuation and long juvenile phase of the crop are the major weaknesses faced by the stakeholders in the coconut sector. Occurrence of new pests like white fly, though under ETL currently and under observation by the concerned organizations in the country, is a future threat to the coconut farmers.

Hence, thrust has been given on quality planting material production, increasing production and productivity to meet the demand, promotion of export of coconut and coconut products, replanting and rejuvenation of coconut gardens, entrepreneurship development in value addition, market intelligence, etc. towards the goal of doubling the income of farmers. ■

Errata: The name of authors of the article 'Tales of Coconut Counties and Islands Around The World' (reproduced from Cocoinfo International 24 (2): {35-38}) published in the June 2018 issue of Indian Coconut Journal may be read as Shareefa. M, Thomas, R.J., and Josephraj Kumar of ICAR-CPCRI.

Catering to the growing demand for coconut products: Mezhukkattil Mills

Success Story

Action speaks louder than words, and all success stories are about taking courageous action, against the tide. Hard work during challenging, tough times brings results. The story of Mezhukkattil Mills is not different -- a great success story spanning over 40 years. From its very modest beginning in 1976 to a multi-crore turnover company, Mezhukkattil Mills the leader in the field of coconut oil and related industries.

A Humble Beginning

With a perspective of doing something of his own in Kerala in 1976, Shri. M. B. Muhammedali decided to start an oil mill. Being from a state rich in coconut production, he thought it will be easy. With the limited capital, two rotary chucks were installed for milling the oil. As the market was solely controlled by the buyers then, the company struggled to get ahead. With a positive attitude, he began trading coconut and copra and started supplying to Tata Oil Mills, one of the biggest mills in India. With right ethical approach and consistency, the business flourished.

At one point, Tata stopped sourcing copra and started buying oil from the market instead. It turned out to be a blessing in disguise. With its limited infrastructure and resources, the company strove to supply best quality oil to Tata and eventually became its main supplier.

Opportunity Maximised

Grabbing this opportunity, the company worked hard to cut the custard. During this period Mr. Koyakutty, the younger brother of Mr. M. B. Muhammedali joined the business. With his technical acumen, the company expanded its capacity with modern machines to meet the buyer expectations. It started 24-hour production with three shifts per day.

Business Ethics & Values

Even during the most demanding times, the company never compromised on its core values and quality of products. This enabled it to become a



trusted partner for all its stake holders. The company has made a mark by not keeping any credits with suppliers. The company has never purchased any material on credit.

Commitment on Quality

With its 100% immediate payment on supply policy, it has never compromised on the quality of raw material purchase. The quality of Mezhukkattil's product is even better than the standard parameters.

Challenges

Today the company has grown up from its humble beginning through association with big companies like Tata, Hindustan Lever, Dabur, Wipro, etc, as its clients.

● Success Story

But in between, challenges like labour problems crept in. The company was shutdown for three months. Later on the company started afresh with labourers who stood by the company.

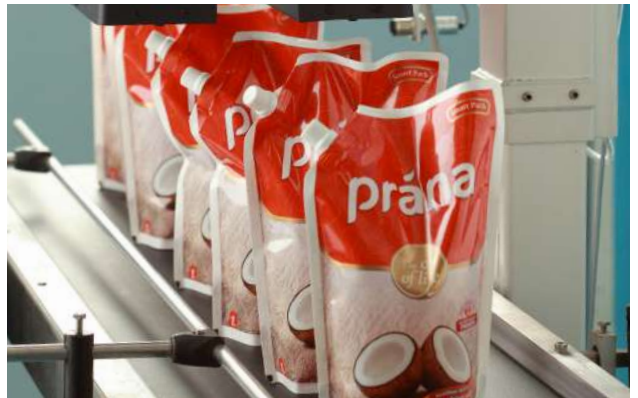
Second Generation Taking Up

Mr. Ubais Ali (Executive Partner) after completing his B. Tech and MBA, contributed his part also in making the company grow further. Thus the brand Prana was born and started large scale production.

Mr. Ali started channelising the company's strength towards better supply. With the new generation, the expertise in handling different kinds of packaging developed. The experience of the old generation and the dynamics of the youngsters have helped the company to expand its operations further. Ali has enabled the company to think globally and got certified by acclaimed bodies such as Bureau Veritas. It is already certified under ISO 22000, ISO 9001, HACCP and HALAL INDIA. The company is also having research centre and state-of-the-art laboratory.

Value Added Services

The company started developing and innovating packaging for different clients in all segments like glass, multi-layer films, PP, PET, HDPE, metal tins, bag in box, flexi tank, etc. The company made good advancement in handling the palletised and non-palletised cargo. The company is also developing new packaging designs for many famous brands of coconut oil.



Product Expertise and Research

The company has put a lot of resources into developing new products such as white coconut oil, cold refined coconut oil and virgin coconut oil. Through continuous research, the company could manufacture RBD coconut oil without heating which is a breakthrough in the current scenario. The company is filing a patent for the same.

Results

Mezhukkattil has now become a leading player in the coconut oil bulk market and in the private labelling front. It is labelling for almost 20 brands spread across 10 countries. Its clientele includes Eastern, Lulu, Super, P&B Foods, etc.

Going forward

The company is growing and is adding more coconut-related products into its product basket, which can help the existing clientele to source material from the company. It is also launching its 'organic' range of products which will help access new international market. Mezhukkattil is in the process of getting itself certified by BRC, FSSC, etc, to pitch to new levels of client set, so that the Indian coconut products could be sold across the globe.

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Role of Bio control agents in Management of pest of coconut

A farmer's meet was organised by Horticultural Research Station (AICRP on Palms), Ambajipeta as part of silver jubilee celebrations of National Bureau of Agricultural Insect Resources (NBAIR), Bengaluru on 5th July 2018. Around 150 farmers from various mandals of East Godavari District attended this meet. Dr. Chandish R. Ballal, Director, NBAIR, Dr. S.K. Jalali, Principal Scientist (Entomology), Dr. K. Sridevi, Senior Scientist (Entomology), Dr. Selvaraj, Scientist (Entomology) and Dr. Lalitha, Technical Officer from NBAIR, Bengaluru participated in farmer's meet.

Dr. N.B.V. Chalapathi Rao, Sr. Scientist, Horticultural Research Station, Ambajipeta highlighted the importance of bio-control and thanked NBAIR for choosing HRS, Ambajipeta for celebrating their Silver Jubilee. He stated that the bio-control lab. facility will be extended and bioagent multiplication will be increased after inauguration of biocontrol facility in the research station. The chief guest, Dr. Chandish R. Ballal, Director, NBAIR, Bengaluru, spoke on management of rugose spiraling whitefly and advised farmers not to spray any chemical insecticides against rugose spiralling whitefly as it could reduce the parasitoid population. She appreciated the efforts made by Dr. N.B.V. Chalapathi Rao, Sr. Scientist, for bringing parasitoids from AICRP Centre, Aliyarnagar (Tamil Nadu) and releasing them in the rugose spiraling whitefly effected coconut gardens. In her speech she emphasized the role of bio-control in managing coconut pests and stated that NBAIR, has started three regional contingency centres at Ambajipeta, Anakapalli and Rajahmundry in Andhra Pradesh for promoting bio-control research and reaching the needy farmers. These regional centers will receive annual funding of Rs. 5,00,000/- towards multiplication and distribution of bio-control agents to the farmers. Further, she suggested to rear predator *Dichochrysa astur* and to standardize its multiplication technique at Horticultural Research Station, Ambajipeta.

Dr. S.K. Jalali, Principal Scientist, NBAIR, Bengaluru, spoke on invasive pests and steps to be taken to enlighten farmers. He explained the role of bio-control in management of invasive pests. The



Lifecycle, biology and host range of rugose spiraling whitefly were explained by Dr. SelvaRaj, Scientist, NBAIR, Bengaluru. Shri. R. Jayanath, Assistant Director, CDB spoke on the successful combined collaborative efforts between HRS, Ambajipeta and CDB for controlling the outbreak of black headed caterpillar at Allavaram mandal of East Godavari district. Further, Sri Bonam Nageswar Rao, Board member, Dr. Y.S.R. Horticultural University requested farmers to avail the biocontrol services provided at HRS, Ambajipeta. Dr. J. Dileep Babu, Director of Research, Dr. Y.S.R. Horticultural University appreciated NBAIR for funding HRS, Ambajipeta. He further instructed HRS scientists to multiply parasitoids on larger scale to reach farming community.

The Director of Research, Dr. J. Dileep Babu, Dr. G. Ramanandam, Principal Scientist (Hort.) & Head, HRS, Ambajipeta, Dr.N.B.V. Chalapathi Rao, Senior Scientist (Ento.), Dr. E. Padma, Scientist (Hort.), Mrs. B. Neeraja, Scientist (Pathology), HRS, Ambajipeta and C.H. Srinivas Assistant Director of Horticulture also took part in the meeting.

(Report prepared by Dr. N. B. V. Chalapathi Rao AICRP on Palms, HRS, Ambajipeta, East Godavari, A. P)

Agri horti Expo 2018

Coconut Development Board participated in Agri Horti Expo 2018 at Pragati Maidan, New Delhi from 27th to 29th July 2018. Coconut based product manufactures and artisans exhibited their products and had sales counters in Board's stall. Board displayed an array of value added coconut products and information brochures. Different types of spoons, bowls ornaments etc made out of coconut shell by craft persons from Bihar, organic VCO and cosmetic products including value added products from NGO products and Tender Coconut water from Yogic products were also displayed in Board's stall.

The three day exhibition was organized with special focus on Agricultural & Horticultural Advancements and International Trade; Protected cultivation (Green house), Irrigation & Farming



Technologies; Organic farming and fresh fruits, Vegetables, Cereals etc.; Hi Tech seeds, Fertilizers & Pesticides; Processed Foods & post harvest technologies; Agri Finance, Insurance & Research Institutes; Cold storage & Technologies. The event was organized by M/s. NNS Media Group, New Delhi.

15th International Agro Food & Beverages Expo, 2018

Coconut Development Board, Regional Office, Bengaluru, Karnataka participated in the 15th International Agro Food & Beverages Expo, 2018 held from 2nd to 4th August, 2018 at Dr. Shyama Prasad Mukherjee Indoor Stadium, Goa University, Taleigao, Goa. With the objective of promoting the small and medium entrepreneurs engaged in the manufacturing of value added coconut products, Board provided the platform to seven coconut based entrepreneurs in one of the largest and most comprehensive expo in Goa "15th International Agro Food & Beverages Expo, 2018" to showcase their products and to identify market channels for their product to bring awareness among the consumers and to identify distributors and dealers.

The CDB stall was inaugurated by Shr. Nelson Figueirdo, Director of Agriculture, Directorate of Agriculture, Government of Goa. Over 150 National and International exhibitors from different categories participated in the expo. The focus of participation in the expo was to promote coconut based value added coconut products and to identify the distributors, dealers and retailers for coconut products in India and abroad.

Board exhibited value added products like branded coconut oil, virgin coconut oil, packed tender coconut water in bottles & cans, coconut based vinegar, desiccated coconut powder, coconut milk &



powder, neera and neera based products, virgin plus coconut oil, virgin oil capsules, hair cream, mouth freshener, body massage oil, coconut biscuits Board's publications / Journals etc. in the Board's Pavilion. Many technical queries on cultivation and schemes of the Board were clarified. Board officials also attended business enquiries and general enquiries on the coconut value added products. Enquiries were received for desiccated coconut powder, virgin coconut oil, coconut milk, coconut milk powder packed tender coconut water, and neera based products.

Shri. Shripad Naik, Hon'ble Union AYUSH Minister, Govt. of India visited Board's stall and enquired about various value added products of coconut. Officials of various National and International companies and business communities visited CDB Stall.

Cultural practices in Coconut Garden - September

C. Thampan, P. Subramanian and S. Jayasekhar
ICAR-Central Plantation Crops Research Institute, Kasaragod

Planting

In low lying areas, planting of coconut seedlings can be undertaken in small sized pits or on mounts raised to one metre above water table. Prevent accumulation of rain water in the seedling pits by ensuring adequate drainage. In regions like Tamil Nadu field preparation should be done for new planting.



Manuring

Circular basins of 1.8m in radius and 25 cm depth may be dug and green leaf or compost or farm yard manure at the rate 50 kg per palm may be spread in the basin. Two third of the recommended dose of chemical fertilizers may be spread over the green leaf or compost and covered. Application of 500 g N, 320 g P₂O₅ and 1200 g K₂O per palm per year is generally recommended for adult plantations. To supply two-third of the above nutrients it is necessary to apply about 0.72 kg urea, 1 kg rock phosphate (in acidic soil) or 1.33 kg Super Phosphate (in other soils) and



1.33 kg of Muriate of potash (MOP). Under irrigated conditions, one fourth of the recommended dose of chemical fertilizers can be applied during September.

It is always recommended to apply chemical fertilizers based on the soil test results rather than going by the general recommendations.

Wherever Boron deficiency is noticed 100 g Borax may be applied in the basin. For coconut palms showing yellowing of leaves due to Magnesium deficiency, 0.5 kg of magnesium sulphate can be applied in the basins along with other fertilizers.

The above schedule of manuring is suitable for all the major coconut growing regions which are mostly benefitted by South-West monsoon during the season. In localities of Tamil Nadu, which are mostly benefitted by North-East monsoon the first dose (one third of recommended dose) of chemical fertilizers can be given during September. Under such situations, lime or dolomite or gypsum @ 1kg/palm need to be applied two weeks before the first dose of chemical fertilizers are applied.

Green manuring

Wherever green manure crops are grown, plough in the green manure crop (after attaining 50 per cent flowering) and incorporate into the soil.

Intercultural operations

Ploughing/digging of interspace is to be undertaken to keep the plantation free of weeds. Care should be taken to avoid injury to coconut palm while ploughing.

Nursery management

Weeding should be done in the nursery. Five month old ungerminated nuts and dead sprouts should be removed from the nursery. In localities of Tamil Nadu, which are mostly benefitted by North-East monsoon, land preparation can be taken up for sowing seednuts.

Crown cleaning

Wherever crown cleaning has not undertaken during August the same may be done during this month.



Mulching

Mulching of palm basins can be undertaken during the second fortnight of September to conserve moisture

Plant protection

Integrated Pest Management

Rhinoceros beetle

Adopt mechanical method of control by extracting beetles with beetle hooks, without causing further injury to the growing point of the palm. The top most leaf axils may be filled with powdered neem cake/marotti cake (*Hydrocarpus sp/ pongamia*) @ 250 g + fine sand (250g) per palm as a prophylactic measure. Filling the innermost three leaf axils with 4 g each of naphthalene balls covered with sand (12 g/palm) for juvenile palms. Placement of two perforated sachets containing *chlorantraniliprole a.i.* 0.4% (5 g) or fipronil (3 g) or one botanical cake (2 g) developed by ICAR-CPCRI and incorporation of the biomass of weed plant *Clerodendron infortunatum* Linn. in the cow dung/compost pit can also be done. The breeding sites may be treated with green muscardine fungus (*Metarhizium anisopliae*)

Red Palm Weevil

Avoid causing injury to the palms, as they would attract the weevil to lay eggs. Mechanical injury if any, caused should be treated with coal tar. While cutting fronds, petiole to a length of 120 cm is to be



left on the trunk to prevent the entry of weevils into the trunk. Removal and burning of palm at advanced stage of infestation would aid in destruction of various stages of the pest harboured in the trunk. Prophylactic leaf axil filling suggested for rhinoceros beetle is very essential as this pest pave way for red palm weevil.

If damage occurs in the crown, the damaged tissue has to be removed and insecticide suspension, *imidacloprid* (0.02%) @ 1 ml/L of water may be poured in. In case of entry of weevil through the trunk, the hole in trunk may be plugged with cement/tar and the top most hole is made slanting with the aid of an auger and the insecticide solution is poured through this hole with funnel.

Eriophyid mite

Spraying on the terminal five pollinated coconut bunches with neem oil garlic soap mixture @ 2 per cent concentration (neem oil 200 ml, soap 50 g and garlic 200 g mixed in 10 litres of water) or spraying neem formulations containing 1 per cent azadirachtin @ 4 ml per litre of water or spraying palm oil (200 ml) and sulphur (5g) emulsion in 800 ml of water and root feeding azadirachtin 10,000ppm @ 10 ml + 10 ml water is effective. Along with the recommended dose of manures and fertilizers, 5 kg neem cake should also be applied.

Coreid bug

Spray neem oil-soap emulsion (0.5%) on the



pollinated bunches. The emulsion can be prepared by adding 5 ml neem oil and 8 g bar soap in one litre water.

Rugose Spiralling Whitefly

No chemical insecticide should be sprayed on leaves. Apply 1% starch solution on leaflets to flake out the sooty moulds.

In severe cases, spray neem oil 0.5% and no insecticide is recommended. Install yellow sticky traps on the palm trunk to trap adult whiteflies. Encourage build up of parasitoids (*Encarsia guadeloupae*) and re-introduce parasitized pupae to emerging zones of whitefly outbreak.

In situ habitat conservation of the sooty mould scavenger beetle, *Leiochrinus nilgirianus*

Integrated Disease Management

Bud rot

Remove the infected tissues of the spindle completely. Two or three healthy leaves adjacent to the spindle may have to be removed, if necessary, for easy removal of all rotten portions and thorough cleaning. After removing the affected tissues apply 10% Bordeaux paste and cover the wound with a polythene sheet to prevent entry of rain water. The protective covering has to be retained till normal shoot emerges. Destroy the infected tissues removed by burning or deep burying in the soil. Spray 1% Bordeaux mixture to the surrounding palms

Stem bleeding

Avoid burning of trashes near the tree trunk. Avoid injury to the tree trunk. The affected tissues should be completely removed using a chisel and smear the wound with 5% hexaconazole (5 ml in 100 ml of water) and drench the basins @ 25 lit. of 0.1% solution

Smearing paste of talc based formulation of *Trichoderma harzianum* on the bleeding patches on the stem (The paste can be prepared by adding 50 g of *Trichoderma* formulation in 25 ml of water)



Soil application of *Trichoderma harzianum* enriched neem cake @ 5kg per palm and adopt recommended irrigation/moisture conservation practices.

Leaf rot

Remove rotten portion of the spindle leaf and 2-3 successive leaves and pour fungicide solution containing 2 ml hexaconazole 5 EC in 300 ml water/ palm or talc based formulation of *Pseudomonas fluorescens* or *Bacillus subtilis* @ 50 g in 500 ml water/palm into the well around the base of the spindle leaf

Undertake prophylactic measures to prevent rhinoceros beetle attack

Basal Stem Rot/Ganoderma wilt

Remove dead palms, palms in advanced stages of the disease and destruct the bole and root bits of these

palms. Isolation of diseased palms from healthy palms by digging isolation trenches of 2 feet depth and one feet width around the basin can also be done. Avoid flood irrigation or ploughing in infected gardens to prevent spread of the inoculum.

Addition of 50 kg of farmyard manure or green leaves per palm per year and application of *Trichoderma harzianum* enriched neem cake @ 5 kg per palm and irrigating the palm once in 4 days and mulching around the basin is also useful.

Raising banana as intercrop wherever irrigation is possible Root feeding of hexaconazole @ 2% (100 ml solution per palm) or soil drenching with 0.2% hexaconazole / 1 % Bordeaux mixture @ 40 litre solution per palm can also be done.

Field sanitation

Special care should be taken to remove the organic debris/fallen trees etc in the coconut gardens in Kerala state affected by the recent heavy rainfall/flood situation. ■

Market review – July 2018

Domestic price

Coconut Oil

During July 2018 the price of coconut oil opened at Rs.18800 per quintal at Kochi, Rs.18700 per quintal at Alappuzha market and Rs.19400 per quintal at Kozhikode market. During the month, price of coconut oil at all three markets expressed a downward trend during the first fortnight and thereafter expressed a slight upward trend.

The price of coconut oil closed at Rs.18300 per quintal at Kochi and Alappuzha market and Rs.18800 per quintal at Kozhikode market with a net loss of Rs.500 per quintal at Kochi market and Rs.400 per quintal at Alappuzha market and Rs.600 per quintal at Kozhikode market.

The price of coconut oil at Kangayam market in Tamilnadu, which opened at Rs.16667 per quintal, expressed a mixed trend and closed at Rs.16133 per quintal with a net loss of Rs.534 per quintal.

Weekly price of coconut oil at major markets Rs/Quintal)				
	Kochi	Alappuzha	Kozhikode	Kangayam
01.07.2018	18800	18700	19400	16667
08.07.2018	18200	18400	18800	16000
15.07.2018	18000	18100	18600	16000
22.07.2018	18200	18200	18800	16333
31.07.2018	18300	18300	18800	16133



Milling copra

During the month, the price of milling copra opened at Rs.12200 per quintal at Kochi, Rs.12050 per quintal at Alappuzha market and Rs.12200 per quintal at Kozhikode market. During the month, the price of milling copra at all three markets expressed a downward trend during the first fortnight and thereafter expresses a slight upward trend.

The prices closed at Rs.11900 at Kochi market, Rs.11800 at Alappuzha market and Rs.11900 at Kozhikode markets with a net loss of Rs.300 per quintal at Kochi and Rs. 250 per quintal at Alappuzha market and Rs.300 per quintal at Kozhikode market.

Weekly price of Milling Copra at major markets (Rs/Quintal)				
	Kochi	Alappuzha (Rasi Copra)	Kozhikode	Kangayam
01.07.2018	12200	12050	12200	11300
08.07.2018	11850	11850	11850	10600
15.07.2018	11700	11700	11700	10400
22.07.2018	11850	11750	11900	10600
31.07.2018	11900	11800	11900	10650

Edible copra

The price of Rajapur copra at Kozhikode market which opened at Rs. 17100 per quintal increased to Rs.17400 per quintal during the second week and then slumped to Rs.17000 per quintal during the

third week continued at the same level till the end of the month with a net loss of Rs.100 per quintal.

Weekly price of edible copra at Kozhikode market (Rs/Quintal)	
01.07.2018	17100
08.07.2018	17400
15.07.2018	17000
22.07.2018	17000
31.07.2018	17000



Ball copra

The price of ball copra at Tiptur market which opened at Rs.16100 per quintal expressed a mixed trend during the month and closed at Rs.17000 per quintal with a gain of Rs.900 per quintal.

Weekly price of Ball copra at major markets in Karnataka (Rs/Quintal)	
	Tiptur
01.07.2018	16100
08.07.2018	15500
15.07.2018	15000
22.07.2018	16200
31.07.2018	17000



Dry coconut

At Kozhikode market, the price of dry coconut opened at Rs.10100 per quintal. The price expressed a slight downward trend during the month and closed at Rs.9950 with a net loss of Rs.150 per quintal.

Weekly price of Dry Coconut at Kozhikode market (Rs/Quintal)	
01.07.2018	10100
08.07.2018	10100
15.07.2018	9950
22.07.2018	9950
31.07.2018	9950



Coconut

At Nedumangad market the price of partially dehusked coconut opened at Rs.16000 and closed at Rs. 17000 per thousand nuts with a net gain of Rs.1000 per thousand nuts. At Pollachi market in Tamil Nadu, the price of coconut opened at Rs.14000 per thousand nuts and closed at Rs.13000 per thousand nuts with a net loss of Rs.1000 per thousand nuts. At Bangalore APMC, the price of partially dehusked coconut opened at Rs. 25000 and closed at Rs. 17500 per thousand nuts during the month. At Mangalore APMC market the price of partially dehusked coconut of grade-I quality opened at Rs.23000 and closed at Rs.19000 per thousand nuts.

Weekly price of coconut at major markets (Rs /1000 coconuts)				
	Neduman-gad	Pollachi	Banglore	Mangalore (Grade-1)
01.07.2018	16000	14000	25000	23000
08.07.2018	17000	14000	17500	19000
15.07.2018	17000	13000	17500	19000
22.07.2018	17000	13000	17500	19000
31.07.2018	17000	13000	17500	19000

International price

Coconut oil

The international price and domestic price of coconut oil in Philippines and Indonesia expressed a mixed trend during the month whereas the price of coconut oil in India expressed a slight upward trend. The price of coconut oil quoted at different international/ domestic markets is given below.

Weekly price of coconut oil in major coconut oil producing countries				
	International Price(US\$/MT)	Domestic Price(US\$/MT)		
		Philippines/ Indonesia (CIF Europe)	Philippines	Indonesia
07.07.2018	933	894	874	2330
14.07.2018	888	855	851	2330
21.07.2018	891	855	862	2378
28.07.2018	920	878	881	2378

* Kangayam



Coconut

The domestic price of copra at Philippines, Indonesia and India expressed a mixed trend during the month whereas price of copra in Srilanka expressed a slight upward trend. The price of copra quoted at different domestic markets is given below.

Weekly price of dehusked coconut with water				
Date	Domestic Price (US\$/MT)			
	Philippines	Indonesia	Srilanka	India*
07.07.2018	546	436	1350	1543
14.07.2018	538	425	1371	1514
21.07.2018	539	420	1371	1543
28.07.2018	545	465	1388	1551

*Pollachi market

Copra

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

Weekly price of copra in major copra producing countries				
	Domestic Price(US\$/MT)			
	Philippines	Indonesia	Srilanka	India*
07.07.2018	127	139	269	444
14.07.2018	126	132	280	422
21.07.2018	125	132	302	422
28.07.2018	124	132	284	422

* Kangayam

