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Productivity improvement through Laying out of Demonstration Plots

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Coconut Development Board

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

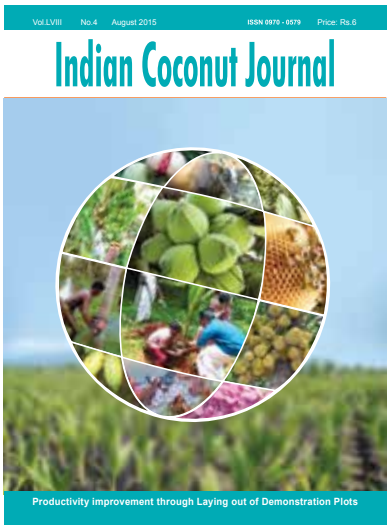
Functions

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

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

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

INSIDE



THEME

Productivity improvement through Laying out of Demonstration Plots

Laying out of Demonstration Plots and the productivity leap of coconut sector

Dear coconut farmers,

Coconut Development Board started the programme Integrated Farming called 'Laying out of Demonstration Plots' (LoDP) in 2006, which facilitated the formation of clusters in contiguous areas of famers for the intensive management of coconut cultivation. Since coconut is a crop of predominantly small and marginal farmers many of the efforts needed for increasing the production, productivity, pest and disease management, aggregation of product etc. could be done in a better and efficient way if it is attempted on a cluster basis. Bringing in better efficiencies of logistics and economies of scale is possible if the farmers in contiguous areas come together and operate jointly. With this primary objective, LoDP was introduced for the integrated development of coconut cultivation on a cluster basis and for ensuring maximum production and productivity of coconut from unit holdings over a period of two years through proper management and timely adoption of package of practices in coconut. Generating additional income through various intercrops, adoption of integrated pest and disease management, aggregation of products and promoting elementary processing of their products for value addition on a community basis are also attempted through LoDP. Over a period of time, coconut farmers across various states showed keen interest in LoDP programme and there was huge demand for this programme from all the states wherever it was implemented. Due to limited resources, we could not satisfy the demand of all farmers in all states. So far, during the last nine years we are able to cover 49,914 ha. in ten states under this programme.

Now it is the time to take stock of this and review the status of implementation of LoDP programme in various states. We also have to look upon how far LoDP has impacted the changes in production and productivity in areas where it was adopted. This was introduced as the name indicates, 'Laying out of Demonstration Plots'. Hence lessons learned from this project need to be practiced regularly by the farmers and demonstrate the impact of integrated farming to other farmers. But most often it is found that after completion of the LoDP after two years, farmers are again neglecting this crop when the price does not commensurate with their expectations. When coconut price is fluctuating widely, farmers loose interest in the timely management of this crop. This leads to reduction in production and productivity. In order to switch over from the alternatively fluctuating prices, we have to look upon methods and mechanisms by which a fair, reasonable and steady price can be ensured to farmers. Intercropping is the first step towards ensuring better revenue from unit area. Selection of appropriate intercrops suiting to the agro-climatic condition of the region, adopting scientific package of practices, aggregation of product, elementary processing at farmer's group level and taking up marketing to the nearby areas preferably to the urban centres are to be taken up as a post script of LoDP programme. This issue of Indian Coconut Journal is trying to retrospect on the impact of integrated farming programme implemented by CDB. How to redefine this scheme and how can we get more allocation for this scheme are the two cardinal questions that are to be looked into.

We need to plant maximum varieties of intercrops under the integrated coconut development programme. The most commonly preferred intercrops are banana, vegetables, fruits, cocoa and tuber crops. Jackfruit, the biggest fruit in the world is often neglected in our country. In Thailand and Vietnam, jackfruit is grown as an intercrop with coconut. Jackfruit can become one of the most prospective crops for farmers if it is cultivated and processed and preserved for value addition and marketed on a larger scale. This is yet another new opportunity for the three tier farmer collectives in coconut sector to explore. Hence we need to plan for developing enough jackfruit seedlings in all the Coconut Producers Federations. Shri. James Joseph, a professional who has established a company named 'Jackfruit 365' and has written a book named 'Gods own Office' on jackfruit, will be sharing his personal experiences in the next issue of this Journal.

During the last two years coconut and coconut oil were fetching reasonably good price. But since May 2015, price fall was recorded in copra and coconut oil. When the Statistics wing of CDB closely analyzed the market behaviour vis-a-vis the estimated yield for this season, we could find few irrational forces acting in the market. CDB started communicating this fact to the farmers through three tier FPOs. The basic details such as estimated productivity and production of coconut producing states, market demand and cyclic nature, market prices during the last 2-3 decades and the possible random behaviour and seasonal behaviour in the market were analysed. On the basis of this, over

view of the price scenario for the next three months was disseminated to the farmers through their groups requesting the farmers not to resort to panic selling. For the time being, the price lowering strategy adopted by certain vested interest groups have slowed down. Price started picking up and the price overview for the next 3-4 months shows that there is no chance of any price fall. It is in this context that farmer collectives need to look aggressively into product aggregation and processing for value addition to ensure a fair, reasonable and steady price to coconut.

With this objective CDB have initiated the formation of Coconut Producer Society, their Federations and its apex body, the Coconut Producer Companies (CPCs). We have requested state level consortium of CPCs to work together to ensure a steady and sustainable growth for the producer company in each states. While encouraging the progressive CPCs, the consortium should help those CPCs which are lagging behind. In Kerala, Neera has become a reality. Out of the 24 companies already established in Kerala, three companies have commissioned their Neera plants and another four are in the offing. CPCs and Federations in Tamil Nadu are trying their level best to get enabling Neera policy from the state government so that farmers can extract Neera using modern technologies for better revenue to farmers. Government of Karnataka has already announced their intention to bring out a farmer friendly Neera policy during this financial year. Efforts are on in Andhra Pradesh also for the same. Let me urge upon the CPCs in Tamil Nadu, Karnataka and Andhra Pradesh to continue their efforts to convince the State Governments to permit coconut farmers through their collectives to extract, process and market Neera. Necessary technical support will be provided from CDB. Training of master technicians in the respective states will also be the responsibility of CDB.

In the forward journey of coconut farmer's collectives, it is necessary to have a very good accounting practice. As our companies are functioning with the share capital collected from member farmers, it needs to be a regular practice to prepare their monthly accounts and publish the same in company's website. Let the Director Board take note of their accounts and expedite the progress of economic activities of the CPCs. Each CPC needs to appoint qualified professionals, CEO and accounting professionals to begin with.

CDB is relentlessly persuading the farmer collectives to take up coconut processing and value addition for realizing maximum income from coconut. Apart from traditional coconut products, we need to focus on products like virgin coconut oil, desiccated coconut powder, coconut milk, milk powder, milk cream etc. Coconut milk is a good source for developing various tasty health products. An young entrepreneurial farmer from Kannur, Kerala has got Ayurvedic certification for curd developed from coconut milk, which is not only protein rich, but also has the power to resist diabetes. I call upon all the CPCs to look keenly into such new opportunities. Kum. Haripriya P R, M Tech student of National Institute of Food Technology Entrepreneurship and Management (NIFTEM), Haryana has developed coconut milk ice cream and coconut cheese as part of her project at CDB Institute of Technology. The director board members of Thirukochi CPC have expressed their interest to start producing these items on a commercial scale.

We need to intensify our efforts in utilizing coconut milk for various value added products like flavoured coconut milk, curd, yogurt, ice cream, butter and cheese which are available in the markets of USA, Canada and Australia. Mangalore based entrepreneur, Shri. Kammath, the owner of 'Naturals' informed that, 34% of their revenue from ice cream is coming from tender coconut ice cream.

While analyzing the functioning of CPCs, there are certain points that need to be addressed on priority basis. Equity mobilization, establishing coconut nurseries, producing good quality, unadulterated coconut oil, setting up Neera processing plants, production of Neera and training of Neera technicians are the most important ones among them. Board has facilitated a meeting of Company Chairmen, CEO and Board Members for formulating proper strategies for marketing of Neera. Enquires for Neera are being received from both domestic and international market. Hence our responsibility is to produce, process and pack Neera as a "Natural, Nutritious, Health Drink" and make it available in required quantities. Products should be manufactured and marketed adhering to FSSAI standards in accordance with seasonal demand. Thirukochi CPC has brought out Payasam (Kheer) with coconut Neera sugar during Onam season in Kerala which is a good example that can be emulated by other CPCs. While congratulating such novel and innovative initiatives, I call upon other CPCs to keep their eyes and ears open for such innovative and creative opportunities. Willingness to take up new ventures, appetite for innovation and efforts to work unitedly are the need of the hour. I request all the CPCs to work untiringly for achieving these goals.

With regards

TK Jose
Chairman

Laying out of Demonstration Plots (LODP)

A productivity improvement programme which received overwhelming response

The scheme 'Laying out of Demonstration Plots' in coconut gardens is a productivity improvement programme which commenced under a major programme of Board viz., "Integrated farming in coconut holdings for productivity improvement ". The Integrated farming programme had its beginning in the mid VII Plan period (1987-88) in an area of 10,000 ha. The technical content of the programme was to cut and remove the disease affected, senile and unproductive coconut palms at an average rate of 2.8 percentage of the palm population, and replant with genetically superior planting material preferably hybrids, promotion of irrigation facilities and multi species cropping system and extending technical support including institutional credit to the farmers for adopting different enterprises. Incentive

subsidies were envisaged at Rs.75 per palm for cutting and removal, Rs.4 per seedling for replanting, Rs. 1000 for irrigation facilities like pumpsets/ irrigation sources and Rs.50 per ha for promotion of multi-species cropping. An institutional support proposed was for the purchase of milch animals and also for starting

other enterprises like bee keeping, piggery, poultry etc. Multispecies cropping was envisaged at 60 per cent of the operational area i.e. in 6000 ha of the total operational area of 10,000 ha. No financial assistance was envisaged for fertilizer application. The programme was implemented by the Department of Agriculture, through the Panchayat level Krishibhavans. Field level staff for the state was also provided for implementing the programme. The total financial outlay of Rs.56.775 lakhs was to be shared on 50:50 basis by the Board and the State Government A credit component of Rs. 227.5 lakhs was a part of the financial outlay of the programme. The programme was implemented in 20,000 ha from 1987-88 to 1991-92.

Expansion of the Programme

A national seminar on `Production and productivity of coconut in India' was held at Trivandrum on 27th September 1986 jointly organised by the Ministry of Agriculture, Government of India and the Govt. of Kerala. The recommendations emanated from the seminar formed the basis for formulating future production and productivity oriented programmes under the State and Central sectors. By this time the root wilt disease was spread in more than 4 lakh hectares in Kerala. It was however experimentally proved that considerable yield increase

Table-1

No. of clusters formed from 2005-06 to 2014-15				
State	No. of Clusters	Area (ha)	No. of Beneficiaries	Exp (Rs in lakhs)
Kerala	556	16482.27	78269	4779.509
Tamil Nadu	271	10206.61	13190	2778.41
Karnataka	145	5953.32	9253	1668.953
Andhra Pradesh	395	12960.17	18701	2255.613
Odisha	32	1186.8	3253	387.9832
Maharashtra	65	1300.33	4032	388.1927
West Bengal	20	706.96	2607	137.5292
Tripura	0	0	0	0.1958
Assam	33	1114.73	4198	70.0478
Chattisgarh	1	2.43	3	0.7988
Grand Total	**1518**	**49913.62**	**133506**	**12467.2325**

Table-2: Yearwise progress in cluster formation

LoDP (Direct) - Cluster Programme since 2005					
Year	State	No. of clusters	Area (ha)	No. of Beneficiaries	Exp (Rs in lakhs)
2005-06	Kerala	4	136.53	923	32.13
	Karnataka	2	50	62	8.65
	Tamil Nadu	1	25	25	1.05
	Andhra Pradesh	1	30	56	6.65
	Odisha	2	50	61	9.45
	Total	10	291.53	1127	57.93
2006-07	Kerala	11	291	1416	55.12
	Karnataka	2	90	126	22.78
	Andhra Pradesh	3	67.24	114	17.00
	Odisha	1	25	45	13.12
	Assam	1	13.6	246	2.29
	Chattisgarh	1	2.43	3	0.37
	Total	19	489.27	1950	110.68
2007-08	Kerala	104	4501	25030	613.34
	Karnataka	5	363	527	73.98
	Tamil Nadu	20	684	823	90.77
	Andhra Pradesh	6	396	631	70.17
	Odisha	4	100	182	21.87
	West Bengal	2	50	344	7.66
	Assam	0	0	0	2.3
	Total	141	6094	27537	880.09
2008-09	Kerala	112	2857	15440	1222.14
	Karnataka	12	687	988	158.36
	Tamil Nadu	35	1230	1709	288.34
	Andhra Pradesh	18	893	1364	205.31
	Odisha	6	200	524	52.49
	West Bengal	2	50	133	17.50
	Assam	1	29	178	2.36
	Tripura	0	0	0	0.20
	Chattisgarh	0	0	0	0.43
	Total	186	5946	20336	1947.12

2009-10	Kerala	101	2718.6	14210	792.54
	Karnataka	12	757.3	1046	211.18
	Tamil Nadu	48	1921.4	2207	509.22
	Andhra Pradesh	33	997.31	2482	258.25
	Odisha	5	200	693	70
	West Bengal	4	100	352	26.25
	Assam	11	105	1499	16.99
	Total	214	6799.61	22489	1884.43
2010-11	Kerala	54	1295.5	6552	547.8
	Karnataka	19	1012.5	1279	259.86
	Tamil Nadu	51	2003.3	2361	662.58
	Andhra Pradesh	25	1002.6	1508	340.77
	Odisha	4	200	527	69.99
	Maharashtra	13	305	531	38.81
	West Bengal	2	50	230	26.18
	Assam	4	27.6	662	21.27
	Total	172	5896.5	13650	1967.26
2011-12	Kerala	32	847.65	4522	256.913
	Karnataka	6	359.95	634	225.444
	Tamil Nadu	15	455.94	836	398.89
	Andhra Pradesh	9	277.24	645	194.676
	Odisha	1	50	92	41.671
	Maharashtra	7	0	440	75.001
	West Bengal	0	203.65	436	9.636
	Assam	2	27.49	0	0
	Total	72	2221.92	7605	1202.231
2012-13	Kerala	99	2709	7616	490.2184
	Karnataka	18	840.48	1088	161.85
	Tamil Nadu	27	844.46	1226	153
	Andhra Pradesh	14	473.91	1111	66.5352
	Odisha	4	207	825	39.739
	Maharashtra	25	527.98	1621	97.7317
	West Bengal	1	25	68	4.375
	Assam	4	42.91	675	11.269
	Total	192	5670.74	14230	1024.7183
2013-14	Kerala	39	1125.99	2560	604
	Karnataka	24	706.65	1264	247.03
	Tamil Nadu	17	505.59	567	204.3
	Andhra Pradesh	29	1108.23	377	201.79
	Odisha	4	130	263	50.76
	Maharashtra	18	407.7	1301	114.6
	West Bengal	1	25	99	7.38
	Assam	5	436.41	400	8.76
	Total	137	4445.57	6831	1438.62
2014-15	Kerala	0	0	0	165.31
	Karnataka	45	1086.44	2239	299.82
	Tamil Nadu	57	2536.92	3436	470.26
	Andhra Pradesh	257	7714.64	10413	894.46
	Odisha	1	24.80	41	18.89
	Maharashtra	2	59.65	139	62.05
	West Bengal	8	203.31	945	38.55
	Assam	5	432.72	538	4.81
	Total	375	12058.48	17751	1954.15
Grand Total		**1518**	**49913.62**	**133506**	**12467.23**

could be achieved through adequate management of the affected gardens. The basic requirements identified for maintaining optimum productivity were irrigation, optimum use of manures and fertilizers, cutting and removal of senile, unproductive and disease affected palms, promotion of intercropping, mixed farming etc. These practices not only improve the income and employment from the existing holdings but also enrich the fertility of soil. The importance of providing irrigation facilities in coconut as a means of increasing the production and productivity even in the disease affected areas was emphasized by the participants in the above seminar. Irrigation facilities would also facilitate intercropping and mixed cropping in the gardens. Therefore an integrated programme encompassing provision of irrigation facilities, replacement of senile and disease affected palms, replanting with quality planting material, optimum use of fertilisers and promotion of multispecies cropping was, therefore felt imperative. Thus the recommendation of the seminar was to expand the integrated farming scheme to a wider area of 100,000 hectares.

A massive programme with coverage of 100,000 ha was thus formulated by the Board during the VIII Plan Period which commenced from 1992-93. From the field level experiences gained and the feed back received from the implementation till then, the quantum of subsidy under various components was increased and the mode of implementation was modified during VIII Plan period. There was a directive from the Government of India to explore the possibility of extending the programme to other major coconut growing states as well. This was in the context that diseases similar to root wilt like Thanjavur wilt, Tatipaka wilt and Ganoderma wilt were causing damages to the coconut cultivation in Tamilnadu,

Table-3: Statewise progress in cluster formation since 2005											
Kerala											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	4	11	104	112	101	54	32	99	39	0	556
Area (ha)	136.53	291	4501	2857	2718.6	1295.5	847.65	2709	1125.99	0	16482.27
No. of Beneficiaries	923	1416	25030	15440	14210	6552	4522	7616	2560	0	78269
Exp (Rs in lakhs)	32.13	55.12	613.34	1222.1376	792.54	547.8	256.913	490.2184	604	165.31	4779.509
Karnataka											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	2	2	5	12	12	19	6	18	24	45	145
Area (ha)	50	90	363	687	757.3	1012.5	359.95	840.48	706.65	1086.44	5953.32
No. of Beneficiaries	62	126	527	988	1046	1279	634	1088	1264	2239	9253
Exp (Rs in lakhs)	8.65	22.78	73.98	158.3586	211.18	259.86	225.444	161.85	247.03	299.82	1668.953
Tamil Nadu											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	1	0	20	35	48	51	15	27	17	57	271
Area (ha)	25	0	684	1230	1921.4	2003.3	455.94	844.46	505.59	2536.92	10206.61
No. of Beneficiaries	25	0	823	1709	2207	2361	836	1226	567	3436	13190
Exp (Rs in lakhs)	1.05	0	90.77	288.3402	509.22	662.58	398.89	153	204.3	470.26	2778.41
Andhra Pradesh											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	1	3	6	18	33	25	9	14	29	257	395
Area (ha)	30	67.24	396	893	997.31	1002.6	277.24	473.91	1108.23	7714.64	12960.17
No. of Beneficiaries	56	114	631	1364	2482	1508	645	1111	377	10413	18701
Exp (Rs in lakhs)	6.65	17	70.17	205.3114	258.25	340.77	194.676	66.5352	201.79	894.46	2255.613
Odisha											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	2	1	4	6	5	4	1	4	4	1	32
Area (ha)	50	25	100	200	200	200	50	207	130	24.8	1186.8
No. of Beneficiaries	61	45	182	524	693	527	92	825	263	41	3253
Exp (Rs in lakhs)	9.45	13.12	21.87	52.4932	70	69.99	41.671	39.739	50.76	18.89	387.9832
West Bengal											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	0	0	2	2	4	2	0	1	1	8	20
Area (ha)	0	0	50	50	100	50	203.65	25	25	203.31	706.96
No. of Beneficiaries	0	0	344	133	352	230	436	68	99	945	2607
Exp (Rs in lakhs)	0	0	7.66	17.4982	26.25	26.18	9.636	4.375	7.38	38.55	137.5292
Assam											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	0	1	0	1	11	4	2	4	5	5	33
Area (ha)	0	13.6	0	29	105	27.6	27.49	42.91	436.41	432.72	1114.73
No. of Beneficiaries	0	246	0	178	1499	662	0	675	400	538	4198
Exp (Rs in lakhs)	0	2.29	2.3	2.3588	16.99	21.27	0	11.269	8.76	4.81	70.0478
Chattisgarh											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	0	1	0	0	0	0	0	0	0	0	1
Area (ha)	0	2.43	0	0	0	0	0	0	0	0	2.43
No. of Beneficiaries	0	3	0	0	0	0	0	0	0	0	3
Exp (Rs in lakhs)	0	0.37	0	0.4288	0	0	0	0	0	0	0.7988

Maharashtra											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	0	0	0	0	0	13	7	25	18	2	65
Area (ha)	0	0	0	0	0	305	0	527.98	407.7	59.65	1300.33
No. of Beneficiaries	0	0	0	0	0	531	440	1621	1301	139	4032
Exp (Rs in lakhs)	0	0	0	0	0	38.81	75.001	97.7317	114.6	62.05	388.1927
Tripura											
Year	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	Total
No. of clusters	0	0	0	0	0	0	0	0	0	0	0
Area (ha)	0	0	0	0	0	0	0	0	0	0	0
No. of Beneficiaries	0	0	0	0	0	0	0	0	0	0	0
Exp (Rs in lakhs)	0	0	0	0.1958	0	0	0	0	0	0	0.1958

Andhra Pradesh and Karnataka respectively. Though these diseases were not so widespread, eradicating the foci of infection and thereby arresting further spread of the diseases was a matter of concern. Therefore a decision was taken by the Govt. of India to extend the programme for integrated farming in coconut holdings for productivity improvement to other traditional belts viz. Karnataka, Tamilnadu, Andhra Pradesh, Goa, Maharashtra, Andaman & Nicobar Islands, Lakshadweep and Pondicherry during the VIII Plan period. The technical content remained more or less same as that of the programme implemented during the VII Plan period, except the additional inclusion of components like assistance for fertilizer application and plant protection measures. Quantum of subsidy was enhanced to Rs.200 per palm for cutting and removal, Rs. 5 per palm for replanting, Rs. 5 and Rs. 3 per palm for fertilizer use and plant protection and Rs. 200/–per ha for multispecies cropping. The programme had 100 per cent funding by the Board instead of the pattern of 50:50 basis hitherto followed. Irrigation component was, however, kept out of the purview of the programme under the pretext that it would be a duplication of the effort of the State Governments as well as that of National Commission for Plastics in Agriculture (NCPA), Govt. of India. The implementation of the programme without including the irrigation component was however, a major impediment experienced in the field adoption. The area covered under the programme was 136800 ha of which one lakh was from Kerala.

Direct Implementation by Coconut Development Board

With a view to assess the impact of the programme, Board had taken up the implementation directly in selected Panchayaths in Ernakulam District, Kerala, utilizing the then existing manpower. A socio - economic survey for collecting the household details of 11 wards of Kumbalam Panchayat and one ward of Kadamakudy Panchayath was conducted in 1994-95 by engaging 38 enumerators. The survey covered 4945 households in Kumbalam Panchayat and 455 households in Kadamakudy Panchayath. Disease affected/unproductive palms were marked for removal. During 1995-96 the cutting and removal of palms and disbursement of subsidy started. Seminars were conducted in these areas in association and active involvement of Krishi Bhavans, Panchayaths, Kerakarshaka Sangham and Ernakulam Social Service Society to create awareness among the farmers. In Moolampilly, 438 palms and in Kumbalam, 2925 palms were removed and subsidy was released. In 1996- 97 also 2104 palms were cut and removed directly by Board. Planting material of intercrops was distributed to farmers to adopt inter cropping in coconut holdings and thereby increasing the income from unit holdings.

Introduction of LODP

During the IX Plan period the programme was altered slightly and a consolidated financial assistance of Rs. 35,000 in two equal annual installments was introduced for adopting integrated management practices. Under the Productivity improvement programme, 'Laying out of Demonstration Plots' and financial assistance to Organic Manure Units (OMU) bifurcated into two components. Cutting and removal component was thereafter treated separately. This modification enabled to bring the northern districts of Kerala also under the productivity improvement programme.

Fragmented holdings do not render themselves viable for the optimum utilization of resources and the adoption of improved technologies. To overcome the unremunerative nature of small holdings and to augment the production and productivity of smaller holdings, group management of resources was felt appropriate to overcome the inherent weaknesses of the fragmented holdings. It was therefore felt essential to create a platform for a group approach for overcoming these problems. Various frontline demonstrations indicated that the yield of coconut

can be improved by more than 100 percent through collective approach. This realization gave way for implementation of LODP in cluster approach. Thus LODP in cluster mode with direct intervention of Board was introduced on trial basis in 2005-06 in Alappuzha district in a limited area. Taking the success of the programme in Kerala, the cluster approach of LODP was extended to other potential states through the network of field offices of the Board. The implementation was in contiguous areas of 25ha to 50ha to make the cluster a vehicle for dissemination of technology and adoption of management practices for achieving higher productivity and increased income. In all these years a portion of fund under this programme was utilized for implementing the scheme directly by state governments as well.

Table-4: Growth rate achieved by different states from 1987-88 to 2012-13

Kerala			
Year	Area	Production	Productivity
1987-88	775.40	3346	4303
2012-13	796.16	5798.04	7264
Growth Rate	0.11	2.22	2.12
Tamil Nadu			
1987-88	189.50	1578.30	8329
2012-13	465.11	6917.25	14872
Growth Rate	3.66	6.089	2.35
Karnataka			
1987-88	213.10	1096.50	5145
2012-13	513.1	6058.86	11808
Growth Rate	3.58	7.08	3.38
Andhra Pradesh			
1987-88	48.80	480.30	9842
2012-13	128.9	1933.07	14997
Growth Rate	3.96	5.728	1.70
All India			
1987-88	1346.00	7269.90	5401
2012-13	2136.67	22680.03	10615
Growth Rate	1.87	4.67	2.74

Implementation of LODP by clusters- advantages

Reducing cost of production, augmentation of farmer's income, improving the marketable surplus,value addition through processing, group dynamism, promoting farmer participatory technology transfer and achieving maximum efficiency by harnessing and sharing the strength and wisdom of farmers were the immediately envisaged objectives of the cluster approach. The strategy helped in improving the efficiency of land and water use, adoption of a community approach in plant protection, procurement and application of inputs and intercropping. The clusters also form the basic unit for primary processing of coconut which will result in enhanced income to the coconut farmers. The cluster involves the participation of nearly 200 farmers and all the farmers become beneficiaries of the programme. This arrangement was an important tool for overcoming the problems associated with scarce resources, fragmentation and dispersion of coconut cultivation and inadequate levels of marketable surpluses. Utmost transparency is assured in the entire implementation which encourages the participating farmers as well as other implementing agencies. Within each cluster, Chairman, General Convener, Group leaders, and other

Table-5: Growth rate achieved by non-traditional states

States	1987-88			2012-13			Increase during 25 years			% increase			Growth Rate		
	Area	Pdn	Pdvty	Area	Pdn	Pdvty	Area	Pdn	Pdvty	Area	Pdn	Pdvty	Area	Pdn	Pdvty
Odisha	27.10	113.7	4196	54.29	380.93	7017	27.19	267.23	2821	100	235	67	2.818	4.955	2.079
West Bengal	19.10	248.5	13010	29.20	369.31	12648	10.10	120.81	-362	53	49	-3	1.712	1.597	-0.113
Goa	23.20	106.90	4608	25.71	122.71	4773	2.51	15.81	165	11	15	4	0.412	0.553	0.141
Maharashtra	7.80	88.9	11397	28.88	187.47	6676	21.08	98.57	-4721	270	111	-41	5.376	3.029	-2.117
Gujarat	0.00	0	0	21.12	322.39	15265	21.12	322.39	15265	0	0	0	0	0	0
Assam	9.10	79.9	8780	22.15	160.21	7233	13.05	80.31	-1547	143	101	-18	3.622	2.822	-0.772
Pondicherry	1.70	22.8	13412	1.95	33.68	17272	0.25	10.88	3860	15	48	29	0.550	1.573	1.017
Tripura	5.60	3.3	589	6.47	27.45	4243	0.87	24.15	3654	16	732	620	0.579	8.843	8.217
A&N Islands	22.80	80	3509	21.88	129.97	5940	-0.92	49.97	2431	-4	62	69	-0.165	1.960	2.128
Lakshad-weep	2.80	24.8	8857	2.57	70.91	27591	-0.23	46.11	18734	-8	186	212	-0.342	4.292	4.650
Nagaland	0.00	0	0	1.30	15.11	11623	1.30	15.11	11623	0	0	0	0	0	0

committee members are selected for easy and smooth implementation by dividing the total cluster area into sub groups of 5 ha each. Community Pest and Disease control programme is carried out against common pests and diseases to reduce the cost. Red palm weevil, a common, but very serious pest is trapped on group basis using pheromone traps in contiguous areas. Field visits and interactions are done on weekly, fortnightly and monthly basis, which enable easy and quick exchange of ideas for adoption of technologies. All farmers in the cluster become beneficiaries of the programme irrespective of the area they possess. The cluster approach has become more acceptable among the farming community and till 2014-15, 1499 clusters in 49993 ha have been formed all over the country. A total of 1.337 lakh farmers have been benefited under the scheme for which an amount of Rs. 124.85 crore has been utilized by the Board (Table 1)

Year wise and State wise progress made under this scheme is shown in Table 2 & 3.

Impact of Productivity Improvement Programme

An analysis of the productivity increase in the country as a result of implementation of the programme from 1987-88 is quite relevant. If we take the first decade since the commencement of the programme ie, from 1987-88 to 1999-97, the national productivity which was 5179 nuts per ha in 1986-87, could be elevated to 7779 nuts per hectare by the end of the VIII Plan (1996-97). The corresponding figures in case of Kerala where lions' share of the fund was utilized, were 4493 nuts and 6013 nuts per hectare.

It was encouraging to note that the intensity of the root wilt disease had also reduced considerably during the period than in the mid 80's. Among the eight districts, in 1985, the highest disease incidence was recorded in Kottayam district, which was 75.63 percent; while in the survey conducted in 1996, Alappuzha district recorded the highest disease incidence, but it was only 48.03 percent. While the mean intensity of disease occurrence in the eight districts was 32.37 per cent in 1984, the corresponding figure as per 1996 survey was only 24.05 per cent. This reduction in the disease intensity could be attributed to the beneficial impact of the programme.

Coming to an overall analysis of the impact of the LODP programme on the productivity of the country, different states present varied pictures. Kerala exhibited a growth rate of 2.117 during the span of two and half decades (1987-88 to 2012-13) while Tamil Nadu, Karnataka and Andhra Pradesh are in the order of 2.346, 3.379 and 1.699 (Table 4).

Other states which recorded significant improvement where LODP was taken up are Odisha, and Tripura (Table 5).

The country recorded a growth rate of 2.74 during the corresponding period. However, it looks significant when we see that growth rate in productivity of India for the three and half decades prior to commencement of the programme was only 0.143 (Table 6)

Benefit of the LODP programme.

Implementation of LODP programme ensured profitability of coconut cultivation through assured yield increase and reduction in pests and disease problems. Farmers could fetch higher income through the sale of multiple products like vegetables, fruits, planting material, vermi-compost, milk and other animal products. Application of organic and inorganic inputs coupled with regular irrigation enriched the fertility status and water holding capacity of the soil. Further, reduction in cost of cultivation to the extent of 25% was visible as a result of collective procurement of inputs and group effort in production management. The farmers were able to sell the produce from main crops, intercrops and could fetch regular income. Technology adoption became a regular practice of the farmers.

Now the implementation of LODP has taken over by Farmer Producers' Organizations under the three tier system of Coconut Producers' Societies, Federations and Coconut Producers' Companies. The role that played by government agencies is now fruitfully shouldered by farmer collectives with more responsibility and inclusiveness. LODP programme has become one conduit for the forward and backward linkages among various stakeholders in coconut sector. Coconut farmers' collectives built a strong base with powerful bargaining power and influential voice as never seen before through the prestigious productivity improvement programme of Board which has been in vogue for two and half decades. ■

Compiled by **Dr. Remany Gopalakrishnan**, *Consultant, CDB, Kochi -11*

Table-6: All India Changes in the production and productivity of coconut

Year	Production (Million nuts)	Absolute change in production (Million nuts)	Compound growth rate (in percent per annum)	Productivity (nuts/ha)
1950-51	3292.3	-	-	5255
1955-56	4224.4	932.1	5.11	6523
1960-61	4639.1	414.7	1.89	6470
1965-66	5035.4	396.3	1.65	5698
1970-71	6075.0	1039.6	3.83	5811
1975-76	5829.4	245.6	0.82	5449
1980-81	5942.0	112.5	0.38	5485
1985-86	6770.3	828.3	2.64	5524

growth rate 0.143

Integrated Nutrient Management-key for productivity improvement

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

Considering the importance of preserving the fertility of the soil, Food and Agriculture Organization (FAO) of the United Nations decided to observe 2015 as International Year of Soils (IYS), The objective is for raising awareness on the importance of sustainable soil management as the basis for food systems, fuel and fibre production, essential ecosystem functions and better adaptation to climate change for present and future generations. Degradation of soil fertility has been identified as one of the most serious problems in coconut gardens due to the continuous cultivation of this crop in the same soil for several years. Coconut palms have high nutrient requirements that have to be met throughout their long growing periods. Non-adoption of regular nutrient management practices to compensate nutrients uptake by the coconut tree has resulted in degradation of soil fertility. Coconut is a crop which removes large quantity of nutrients from the soil compared to other perennial crops. For example, a cashew tree under good management condition producing 10-12 Kg. nuts per tree requires 125 grams of potash in a year where as the coconut tree producing 80 –100 nut per year requires 1200 grams of potash in an year to maintain the productivity of the soil and the tree at optimum level.

The maintenance of soil properties at a considerably optimum and sustainable level can be attributed to the continuous enrichment of nutrient pool coupled with minimum loss from the system. Enrichment of nutrient pool occurs from additions from the trees, crops, livestock and farm waste. Trees like cocoa raised as mixed crop in coconut contribute to the nutrient pool by way of litter fall. The residue from other under story crop components (banana pseudo stem, non edible vegetative portion of tuber and other herbaceous crops are recycled as mulches. A part of nutrients locked up in these parts are returned to the nutrient pools.

Productivity in coconut is influenced by a variety of factors. However, adoption of Integrated Nutrient management (INM) is the key for the success of a sustained productivity. The major components of this package are balanced nutrient management with emphasis on organics and basin management with green manure crops. Integrated Nutrient management to ensure sustainability of physical, chemical and biological functioning of the soil is one the most important management practices promoted by the Board under the integrated farming scheme. It helps in enhancing the productivity of coconut palms. The response of coconut palm to different management practices proved that the yield of coconut palms can be doubled when compared to neglected garden. Regular manuring right from the first year of planting is essential for good

vegetative growth, early flowering and high yields. Integrated management practices involving application of organic manures in sufficient quantities to improve the soil health, conditioning of soil by application of liming materials and then fertilizer application @ 500gm Nitrogen, 320gm Phosphorus and 1200gm Potash are generally recommended for coconut garden, yielding 100 nuts/rec/ year.

Role of balanced nutrition in coconut garden

Potash, nitrogen, chlorine, phosphorus, magnesium and boron are the major fertilizer elements commonly recommended for successful coconut production. It is required for coconut palms in large quantities. In nature it is found in many compounds and minerals. For example, potash occurs in two forms vice muriate of potash and sulphate of potash. For better and profitable farming, balanced fertilization with nitrogen, phosphorus, potassium and also with chlorine is essential. Removal of nutrients from the soil include primary uptake by the trees which is either locked up in the vegetative parts mainly or exported to harvested produce. Nutrient removal through harvested produce is compensated by nutrient inputs trough manure, fertilizer, recycled crop residues etc. In any land use system, the most direct and primary requirement for sustainability is to maintain soil fertility. The continued effect of lowering soil organic matter, deterioration of soil physical properties and lowering the nutrient content is commonly referred to as decline in soil fertility.

Organice manures and its importance

Organic manure is very essential in coconut nutrition. Organic manures are important as they contain several nutrients though in lower concentrations than inorganic fertilizers. Organic matter promotes microbial process in the soil, improves the soil structure, aeration and water holding capacity. It has a regulating effect on soil temperatures, delays the fixation of mineral acid and supplies decomposed products which aid the growth of plants. More over it is a slow source of uniformly active nitrogen and consequently has a beneficial influence on the protein content of plants. Organic manures include both bulky and concentrated manures. Farm Yard Manure (FYM), compost and green manures are bulky organic manures where as oil cakes and fish manure are concentrated organic manures. About 25 – 50 kg of any bulky organic manure supplemented with required quantity of inorganic fertilizers is the best balanced combination of maures for an adult bearing palm.

Green manuring

Green manuring is one of the means to maintain organic matter status in the soil. It includes both green crop manures and green leaf manures. The leguminous green manure crops have been found to improve the nitrogen status of the soil. Further, the green manuring improves soil structure, release plant nutrients present in the soil in an available form, conserves nutrients from leaching losses, regulates soil temperature and minimizes the loss of soil due to erosion. Growing and incorporating green manure crops in soil helps to improve soil fertility.Application of nutrients like N increases morphological characters like leaf area and root length of the crops which are responsible for enhanced water use efficiency through improvement in water uptake, evaporation and transpiration. Extensive root proliferation occurs due to improved P supplies. The enhanced root activity explores soil volumes to greater depths.

Sunhemp (*Crotalaria juncea*) wild sunhemp (*Crotalaria striata*), daincha (*Sesbania aculata*) and *sesbania sp.* are the most suitable green manure crops for growing in situ in the coconut gardens. Plants like *Gliricidia maculate* and *Tephrosia candida* can be grown along the boundaries of the coconut garden and the green matter can be cut and applied to coconut palms. Leguminous crops like Calapagonia, *Stylosanthes gracillis*, *Mimosa invisa* also fix nitrogen biologically with help of bacterium rhizobium present in root nodules. The nitrogen fixed by legume – rhizobium association becomes available to coconut palm by the decomposition of nodules and plant materials after incorporation. Among the green manure crops Crotalaria striata is the most suitable green manure crop for growing in situ and incorporating in gardens. This is because of its quick growth, giving good tonnage of organic matter, leaf material rich in nitrogen, tolerance to shade and stand up to heavy rains, producing seeds in abundance and is not eaten by cattles.

Nutrient Management

The general recommendation for fertilizing adult bearing palm is to apply 500g N, 320g P_2O_5 and 1200g K_2O/palm/year. To supply this quantity of nutrient it is required to apply 1.1 kg urea 1.5 kg mussoriephos and 2 kg muriate of potash. Wherever yellowing due deficiency of magnesium is noted, application of 500g Magnesium sulphate is essential. Deficiency of micro nutrient like boron commonly noticed in coconut gardens. Application of borax @50 -200 gram per tree depending on the intensity of deficiency symptoms is to be given to such palms. In inland areas, application of common salt @1kg per palm is recommended when the soil is having sufficient moisture to reach out the salt from the root zone. Fertilizers should be applied under optimum soil moisture

conditions. Fertilizer applications is usually recommended in two splits a year. One third of the recommended dose must be spread around the palms within a radius of l.8 m and forked in immediately after the pre-monsoon showers. Remaining two third fertilizer doses should be applied in September when the monsoon rain recedes along with 30 kg of green matter or 25 kg of FYM. This enables the farmer to get higher crop yields.

Fertigation, a widely adopted practice in Israel and other advanced countries, is an efficient method of fertilizer application through drip system. Drip fertigation increases the fertilizer use efficiency, saves fertilizer costs, reduce labour requirement and supply nutrients according to crop demand during varying physiological stages. It also ensures uniform, precise and direct application to root zone, correction of micronutrient deficiencies etc. Soluble fertilizers viz., urea, DAP and potassium chloride can be combined and supplied through drip irrigation. The other possibility is to use liquid fertilizers which are highly soluble, hence there will be no interference and no clogging. But the cost of these fertilizers is very high.

In an year, fertilizers can be applied four times in equal splits depending on the rain fall period. It is not practiced by the farmers due to the higher labor charges for application. Hence it is recomended to apply the fertilizers in one or two splits depending on the rainfall periods inorder to ensure sufficient moisture in the soil for uptake of nutrients supplied through the fertilizers. However fertilizers should not be applied during heavy rainfall season. Studies conducted by research indicated that 50 % of the recommended dose of fertilizer when applied through drip fertigation is sufficient to produce 100 % of the recommended yield.

Phosphous application can be skipped in areas where the available phosphorus in soil is more than 20 ppm/ha. Here, fertigation can be practiced with urea (nitrogen) and muriate of potash alone (potassium). However phosphorus need to be applied once in two years or once the soil phosphorus reaches less than 20 ppm. Soil and leaf analysis could be a useful tool for making fertilizer recommendations and to identify the deficient nutrient elements. The requirement of micronutrient for coconut for different coconut growing area are Boron, copper, Zinc ,Magnesium and Manganese. However it depends on the area where coconut is grown. Besides, adequate quantity of bulky organic manure at 50 Kg per palm is generally advocated. This not only provides some of the micronutrients needed by the palms but also improves the soil physical conditions including water holding capacity.

Integrated farming scheme of CDB to promote INM

In order to motivate farmers to adopt Integrated Nutrient Management practices, Board is providing technical, financial assistance @ Rs.35, 000 per hectare, @ Rs.17500 each in two annual installments under the scheme 'Laying out of demonstration plots'. The area selected for implementing scheme will be given critical inputs like micro-nutrient mixtures, bio-fertilizers and chemical fertilizers free-of-cost as stated above and technical knowledge on how to maintain soil fertility at optimum levels will also be imparted. Each of the beneficiary farmer will be given recommended fertilizers for cultivation at the rate (almost 175 trees under a hectare), 1.0 kg of urea, 2 kg of super phosphate and 2 kg of potash per palm in the demonstration area. Besides, other fertilizers like borax, magnesium and intercrop planting materials are also being given on need basis. Apart from this hand-operated and power sprayers to combat insect and pest attacks, and carrier vehicles for transportation of inputs under the community operation component of Integrated farming scheme are also supplied to the farmers. The scheme is being implemented in sixteen states and three Union Territories through the State Agriculture or Horticulture Departments and also directly by Coconut Development Board through the Farmer Producer Organizations. The scheme is implemented on the basis of the action plan prepared for the farmers groups. Community approach is adopted for procurement and application of inputs. The maximum eligibility of a farmer for financial assistance under the scheme shall be limited to one hectare. The Board also support the farmers for production of quality vermi compost or coir pith compost. Board will meet 100% of the cost subject to a maximum ceiling of Rs.30,000 per unit under another component programme of Integrated farming scheme for productivity improvement.

Conclusion

One of the most important management practices promoted by the Board under the integrated farming scheme for productivity improvement is maintaining the fertility of the soil of coconut gardens by adoption of integrated nutrient management practices. Critical inputs for supply of major nutrients required for the palm is arranged to supply under the scheme. In general, number of nuts, nut size and kernel content are higher in palms applied with both fertilizers and organic manures. By adoption of integrated nutrient management practices, soil health as well as health of palms could be improved over the years and maintained without further deterioration and obtain potential yield from coconut on sustainable basis ■

Dovetailing Coconut farmers in Palakkad

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The Palakkad Coconut Producer Company(PCPCL) formed by federating 24 Coconut producer federations with a farmer strength of 24000 is well ahead in initiating multiple programmes in various fields with an urge to pioneer the best technology in association with some of the premium institutes of the country. PCPCL is having an authorized share capital of Rs 5 Cr. and member farmers have mobilized share of Rs 2.6 Cr. as on 13th August 2015.

Lets have a brief look into the various developmental programmes taken up by PCPCL for the overall growth of coconut farmers.

Research & Development

Having no established model in this industrial vertical, PCPCL had experimented, tested and adapted technologies from Central Plantation Crops Research Institute (CPCRI), Kasargode for the extraction of high quality neera (with pH value of 6.5 to 7.0) and establish a no preservative, nutritious, virgin health drink under the brand name 'Pam Dew'.

PCPCL had created history by establishing a Memorandum of Understanding (MoU) for research for processing Neera, with one of India's state of the art technological marvel called Central Food Technological Research Institute (CFTRI) on a unique revenue sharing model. This seems to be a very rare model with a public sector institute. In the latest review meeting held on 20th July, 2015, CFTRI has informed that they are in the last leg of their trials of the proposed first product research with two remarkable breakthroughs are ready to be submitted for approval of PCPCL by end of August, 2015. The Team PCPCL and the Team CFTRI are happy to note that the outcome of this research would bring out better products to the world, which will leapfrog India ahead in the segment.

Neera Processing Plant

The processing plant construction is progressing. A honey making unit using vacuum evaporator technology is expected to commence in a month with a honey processing capacity of 500 litres/ hour. Currently PCPCL is

On the special occasion of Onam, PCPCL offer all its member farmers a 'Farmer's Corner' in its 'COCONUT POINTS' to showcase their products! The chemical free farm produces and its value additions can be sold in the PCPCL Retail Chain. Palakkad, being the rice bowl of Kerala, PCPCL introduce varieties of rice, rice flakes, rice powder and value added product blends of rice and coconut, which are sourced directly from member farmers. Farmers are liberated to celebrate Onam. Product Bouquet include, 'Aval Vilayichathu', exotic range of 'Chammanthipodi', mouth watering 'Pazham Paani (Roasted Banana in Coconut Honey), Dosa Batter, Turmeric Powder, Natural Black Pepper, etc.

in an advance stage of entering into a marketing agreement of PamHoney and PamSugar for entire western and northern region with an experienced trading group, apart from the overseas markets. As the PCPCL had already initiated processing through traditional method, it is expected to deliver the first off-take by 1st week of August, 2015. After the sampling done by this proposed associate of PCPCL, the response they are receiving seems to be overwhelming and they themselves are excited over this response.

Drip Irrigation

Under the farmer welfare programme, PCPCL negotiated hard with M/s. Jain Irrigation Systems Limited for an approximate 1000 acres drip programme and are able to offer approximately 20% discount on the MRP of such high quality pipes and accessories. This programme became slow as it begun to rain again! However, still the material is moving out as the intensity of monsoon is fading out.

Micro Enterprises

As of now, PCPCL has 25000+ shareholding farmers, which Is ever increasing and approximately 50000+ farmers are in the ambit of this three tier structure. PCPCL envisages processing at least 20% of the nuts produced by these farmers by establishing at least two micro enterprises in each CPS over a period of two years. The first 12 units among such enterprises are expected to start production soon with the help of financial assistance from Kerala Finance Corporation (KFC). They had already undergone two levels of 'Entrepreneurial Development Programme (EDP)' trainings on building capacity and a final exposure visit to identified institutes would make them freeze the projects, technologies and machinery.

In order to strengthen the activities of federations and societies, PCPCL is also undertaking capacity building and skill development programmes. FoCT new batches are about to get started and the Neera Technician Training programme is going on as part of the skill development. PCPCL's Human Capital Management (HCM) Division started formally functioning and initiated Communication Skill Enhancement Programme for batches of employees for improving their communication. This division has also initiated a process to identify and develop a management cadre selected from educated individuals, especially women, who would be keen to use their knowledge and skill. A key group is formed to work out modalities of conceiving and formulating training modules in affiliation with some of the premium institutes.

The monitoring of activities are being done smoothly by the subcommittees organized by PCPCL.

Neera Subcommittee

Despite all the odds and investments, the neera production across the federations had significantly increased. Though this is a happy outcome, it is alarming as the sale is down due to the monsoons. The Neera subcommittee has been taking some tough decisions to sustain and move forward. Coconut points established by PCPCL is throughout the district and is getting popular. As on date, 25 coconut points are selling neera, neera honey, syrup, sugar and other coconut products such as coconut oil, chips etc.

Coconut Procurement

& Oil Production

The coconut procurement pilot was carried out by Nemmara Block Federation and procured approximately 1.1 Lakhs nuts and distributed approximately 15+ Lakhs to approximately 50+ farmers. This exercise provides key indicators in terms of expenses on wages and transportation costs etc. On further course, strategizing the procurement process with the minimum requirement of working capital in place and also with a clear goal set on the processing of the procured nuts for value additions. Though coconut oil was made of these procured nuts,

partially force sold high quality copra which was prepared through the quality process with No Sulphur, No Chemicals and No Smoke, in the open market in competition with the normal abused copra to keep the cash flow intact! However, the coconut oil made out of this high quality copra is accepted and after initial lukewarm response, the sales graph of PamFresh Coconut Oil is ticking steadily up, thanks to marketing efforts to boost sales initially. Now, PCPCL had come up with one more variant of the PamFresh Coconut Oil by bringing out traditional chak processing and the variant is called 'PamFresh Coconut Oil' – 'Thani Nadan', which retains lot of virgin values of the original coconut oil. Two medicated oil variants are on trials and on completion of successful trials these medicated variants would be introduced in the market.

Equity Mobilization Committee

The equity mobilization committee has been working hard to conduct monthly meeting of CPSs of all federations, where they have been engaged in making the member farmers aware of the importance of building such a Farmer Producer Organization for sustenance. Though most of our farmers are not able to visualize the need and effect of such an organization, some of them get inspired and initiate participating in the process. This engagement keeps people active in the system. However, our subsidy culture makes our people bargain for petty benefits against the share payments and demand supply of manures for further payment of shares. However, with this committee's outreach drives, the farmers are becoming more and more aware of the significance of the company.

PCPCL knew much in advance, that we are fighting a battle with an undefined battlefield and we need to establish a farsighted strategy to win this and also realised the importance of accurate market data from international arena to evaluate the demand – supply proportions worldwide and also the market dynamics to position our products with added value propositions. Thanks to the support of Coconut Development Board (CDB) and its dynamic team lead by the most enterprising legend of our times, we were directed to committed young entrepreneurs who were as enthusiastic as us on being part of this revolution among farmers. The Sanjivani Naturals Team had done a wonderful job for PCPCL in the last six months by participating in two major organic fairs, one in Germany and another one in London, where they had showcased our flagship products, which received an overwhelming response. They also conducted a deep research in competitive products in the market and brought some valuable data along with few premium brands of honey and sugar available in the international market.

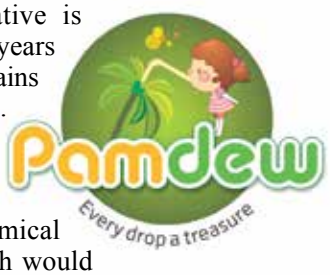
PCPCL is proud to announce that 'Pam Honey' and 'Pam Sugar' would win hands down, in competition with any of those best products available in the international market. PCPCL also did a study on various other hot moving coconut products including coconut chunks (which is similar to chips) and they are much above the products available in the Indian market.

In exploration of technologies and experimenting through new horizons, PCPCL had engaged professionals as consultants for guiding the organization in right direction. Since the beginning, Team PCPCL was consisting of management graduates from IRMA and Food Technologists from premier institutes like IIT, Kharagpur.

There are multiple associations in exploring technologies with premium institutions and it had always been a learning curve with so many revelations and new horizons. PCPCL had taken weighted average of many such existing technologies before taking some concrete decisions. It was learning all the while and through this process PCPCL realized the merits and demerits of many such methodologies prevailing in the market.

Having no model in this segment, it has been a tight rope walk for PCPCL on completely dark terrains of technology and thanks to various institutions, who walked along with support to explore this unknown path. The MoU with M/s. CFTRI is one among the unique propositions in research which made PCPCL's life much easier, in terms of the time, investment and expertise. PCPCL hopes that this journey will be smoother in the coming days and will also ensure farmers fair, stable and reasonable price. ■

PCPCL - CFTRI research initiative is taking a positive turn after about 1+ years exhaustive struggle in the unknown terrains of Coconut Sap (Neera) research. The first ever such revenue sharing partnership in research since the inception is producing fanta-fabulous results in bringing out the most chemical free, nutrient rich, natural drink which would disrupt the existing know-how of the products available. PCPCL's belief in creating value for this 'blessing of the nature' (otherwise called 'God's Own Drink') finds positive results!



Great hope for the health sector

Coconut milk curd

Now vegans too can enjoy curd and butter milk

Thomas George, a farmer from Chemberi, Kannur Kerala, has developed curd from coconut milk. Now vegetarians too can enjoy vegetarian curd, yogurt and lassi. It is hoped that Thomas's novel invention will have good impact on the health sector. A study conducted at one of the Ayurvedic medical colleges in Kerala has proved that consumption of coconut milk curd for a stipulated period of time can control diabetics.

Thomas, a Zoology graduate has invented the coconut milk curd as part of his research in developing value added food products. It was in 2006 that he started working on coconut milk. Elderly housewives of his area used to make butter milk from coconut milk using lemon. But this product was having a very short shelf life. It was his curiosity for making a better shelf life of this product that led him to develop coconut milk curd. He further worked on the ancient wisdom and came out with a process to make value-added products out of coconut milk that are beneficial to health.

Coconut milk gets fermented faster than cow milk. The absence of a certain element could be cited as the reason for this. Thomas started working on improving the process and after trying various options, he came out with a process in which the coconut milk is fermented by yeast and honey mixed with lauric acid as the catalyst. Thomas could invent this element through research and patented this agent as 'coctos'. This neutral agent is acidified and coconut milk is converted to coconut curd. The lauric acid separated from coconut milk and the bacteria lactose acidophilus is mixed with coconut milk and within 24 hours the coconut curd is ready. Thomas has obtained provisional specification from Patent Office Chennai for coconut milk curd under the name 'Thomas George milk curd'

Thomas George

A research conducted at Parassinikkadavu Ayurveda Medical College & Hospital, Kannur, Kerala had proved that coconut milk based curd is more proteinous than the usual curd. Based on this finding, a diabetic patient was advised to take coconut milk curd for one month. Noticeable difference was observed in his sugar levels and this could practically prove the health benefits of coconut curd. Further Thomas got his product tested through the Central Food Technological Institute, Mysore.

The coconut curd prepared by mixing yeast with milk will have a layer of pure coconut oil on top of it. The curd can be used after separating this coconut oil layer and this product does have a shelf life of 40 days. Lassi and butter milk can be made from this product by adding sugar or chilly, salt and curry leaves.

Thomas and his team are preparing to produce coconut milk curd on commercial scale. James Pullat is Thomas's mentor in this initiative. As a first step, the team registered the trade name 'green curd'. Certificate is also obtained from Trade Mark Registry, Chennai for the production, distribution and further usage of milk, curd and ghee processed from coconut. Earlier in 2007, Thomas was recognized by International Coconut Summit conducted by the Coconut Development Board in Kochi for his findings on the beneficial effects of coconut milk in curing migraine. ■

Thirukochi CPCL leading ahead

M.A. Leenamol, Market Promotion Officer, *CDB, Kochi-11*

The Thiruokochi CPCL registered during March 2014 has so far ventured into many activities during this short time span. The major initiative of the company was production, processing and marketing of neera in its own brand. The CPC is having Seven CPFs with licence for neera tapping and has conducted three batches of Neera Technician training. 241 palms of 22 farmers are being tapped presently for producing neera. The latest weekly production status of neera is 1784 litres.

Neera Project

The company has entered in the market by introducing its own neera cake during December 2014. The Neera Pilot Plant of SCMS Kalamassery is taken on rent for processing neera till the company's own Neera plant is commissioned. The CPC has launched its own brand of Thirukochi Premium Neera and also value added products from Neera like Neera Honey, Neera concentrate & Neera jaggery syrup. Trial production of vinegar from Neera also started and is being perfected. Two coconut points have already been set up under the auspice of two CPFs. The latest weekly turnover from sale of Neera and neera products is Rs.3.20 lakh. Construction of Neera Plant is progressing. Machineries for neera processing is already ordered from Alfa Lavel Ltd and the plant is expected to be commissioned by October this year.

Copra dryers and nursery

Two CPFs under the CPC has already ventured into setting up copra dryers of 10000 nuts capacity. The dryer unit of Koothattukulam CPF is almost ready for commissioning and that of Ramamanagalm CPF is under construction. On identifying the relevance of high yielding coconut gardens, Thirukochi CPC has initiated activities for ensuring better income to coconut farmers. The company is promoting planting of quality planting materials being arranged from DSP Farm of Board and hybrids from Deejay and Deebe farms, Tamilnadu. To meet the high demand for seedlings, the CPC is setting up coconut nurseries through CPFs by arranging dwarf seednuts from identified seed gardens in Tamilnadu. Ramamangalam CPF has already planted 10000 seed nuts in their nursery. 30000 seednuts brought from Tamilnadu are being planted in Koothattukulam, Palakuzha and Kalpaka CPF.

Training, capacity building and skill development

The CPC through its CPFs has identified 41 traditional tappers and trained them as Master Neera Technicians at CDB institute of Technology and SCMS. Three batches of Neera Technician training have been conducted so far by the CPC and 49 Neera Technicians are given training under this programme. Realizing the need for more committed Neera technicians who must continue to work for the company, the CPC identified 42 unemployed youth from Assam and got them trained under FOCT programme of Board at DSP Farm,Abhayapuri. The Chairman and CEO of the Company went to Assam and brought these trainees to the company. They are being accommodated at Edathala and are given Neera technician training for further deployment in various CPFs. The training programme is

monitored by Shri. V.K. Sasidharan of Kalpaka CPF, Vazhakulam 13 ladies are also identified and trained in developing value added products from neera. Thirukochi CPC had organized a two day vision sharing workshop at Thattekkad Bird Sanctuary for Presidents of all CPSs, representatives of all CPFs, Director Board members of CPC as well as staff during May 2015.

Financial management system

Thirukochi has appointed Chartered Accountants Sudheep Thomas & Company as the auditor of the company. Shri.Raju K.V from Muvattupuzha CPF is working as the internal auditor of the company. One full time accountant is also maintained by the company. Shri.P.K.Hariharan of Paravur CPF, a retired Joint Registrar from Cooperative sector is rendering assistance for proper monitoring of accounts and financial management of the CPC.

Functioning of sub committees

Thirukochi CPC has constituted seven subcommittees in November 2014 for effective sharing of responsibilities and close monitoring of various activities. The Equity subcommittee chaired by Shri.P.P.Mathai with five members are coordinating share mobilization. Two Neera project subcommittees headed by Shri. M.K.Manmadhan and Shri.Alias Tharian with four members each are responsible for implementation of neera plant project. Shri.P.K.Hariharan heads the subcommittee with five members for Neera Technician Training in CPFs. Project subcommittee chaired by Shri.C.S.N.Menon and three members are responsible for implementing other projects including coconut oil & VCO of the CPC. Marketing committee with 5 members is headed by Shri.George Thomas. Finance and Monitoring Committee headed by Shri. Joseph Babu, chairman CPC has five members and is coordinating financial matters and monitoring project implementation. One more subcommittee has later been identified for Nursery which is headed by Shri T.P.Sunny .

Assistance of technical and management professionals

Voluntary services of experienced and qualified professionals available in the Director Board of the CPC as well as in member CPFs are being utilized by the company. Shri. P.K. Hariharan from Paravur CPF, a retired Joint Registrar from Cooperative sector is assisting in financial management of the CPC. Shri.C.S.N.Menon from Angamaly CPF is a professional dairy unit consultant and his expertise in setting up units is being utilized for CPC's own neera plant. Shri.G.S.Pillai from Alangad CPF, a Chartered Engineer and retired MD of a latex producing company of Rubber Board and Shri. P.K. Sasidharna Nair from Kalpaka CPF, a diploma holder in Electrical engineering having 23 years of experience in chemical industry are assisting in preparation of projects, finalization of machineries for the neera plant and other projects of CPC. Among Directors of the CPC, Shri.M.K.Manmadhan Director representing Koothattukulam CPF is retired Electrical Engineer from FACT and Shri.C.T.George, Director representing Ramamangalam CPF is a retired Town Planner and their services are being utilized by the company. In short, the CPC has an array of qualified and experienced professionals for providing technical and management assistance in all domains of business. The services of Dr. K.K. Jayan, Executive Director(Retd),BPCL has also been availed for mentoring the CPC ■

Thirukochi Coconut Producer Company is manufacturing and marketing products in accordance with seasonal demand. The company is producing Kheer made with coconut neera sugar for distribution during Onam season in Kerala. This is a good example that can be emulated by other CPCs.

The Neera technicians from Assam alongwith the office bearers of Thirukochi CPC

India Starts Drinking Healthy

Arya Aravind, *Journalist, CDB, Kochi-11*

The carbonated drinks which has been ruling the roost for decades, is facing a huge shift as they are giving away the space for the health drinks. Increased urbanisation, rising disposable income and growing health consciousness among the Indian youth has increased the demand for non-carbonated drinks. The situation is ripe for a natural drink like Neera to get into the market. The market size of energy drinks in India is estimated at about Rs 700 crore, growing 20-25% year-on-year whereas the carbonated drinks market is close to Rs 6,000 crore and is growing by 10-12% annually, says a report published by Euromonitor International.

As per the reports of India Analysis; Sustainability outlook In India, "As a part of diet, milk and milk products are consumed by more than 80 per cent people, coffee and soft drinks by less than 60 per cent, bottled water by less than 40 per cent and fruit juices by less than 20 per cent." Therefore there exists tremendous possibility of development of juice industry in India because the ever-growing fitness or wellness trend demands the inclusion of fruit juice/natural juice products in people's diet. The packaged juice market is valued at Rs 1,100 crore (US$200 million) and is projected to grow at a CAGR of around 15 per cent over the next three years.

The long and erratic working hours, changing lifestyles and increasing paucity of time are driving Indian consumers towards consumption of energy drinks, which is consumed to boost stamina and energy levels. It is in this context that Neera should get the right push. The ready-to-drink Neera is one of the most natural and nutrient-rich health drinks available in the market. Drinking Neera is good for keeping the body hydrated

"The urban youth and young adults are ready to try new products as well as ready to spend some quick buck on energy boosting, natural drinks."

and its powerful antioxidants will help you feel refreshed and full of energy. It also regulates body's fluid balance, control temperature and digest food.

The urban youth and young adults are ready to try new products as well as ready to spend some quick buck on energy boosting, natural drinks. You get all the benefits of the 'Tree of Life' from this deliciously refreshing beverage that supports a healthy lifestyle. Neera, which comes in power packed flavours, not only brings refreshment but it also supplements your body with natural vitamins, minerals, amino acids, calcium, phosphorous and is extremely good for your eyes too. Neera contains glutamic acid, which is necessary for protein synthesis. It also aids in digestive health. Neera contain vitamins (Vit.A & Vit.C) which have anti-oxidant properties thereby preventing damage or death of cells. Moreover, it is even good for post-operative care due to the high content of electrolytes. Neera facilitates clear urination and prevents jaundice too. What else a single drink should do other than these? It just gives you complete refreshment.

The energy drinks market in India is dominated by multinationals with brands like Red Bull GmbH leading the market having off-trade value share of 69 per cent during 2013. The other players in this space include Coca-Cola, PepsiCo, Monster Beverage, Spitz KG, Krungsiam Beverage (all multinationals), JK Ansell, K G Functional Beverages, Hector Beverages, Heinz India, Bisleri, Vedantika Herbals, Dabur, Goldwin Healthcare and XXX Energy Drinks. The producer companies across India who is engaged in the production and marketing of Neera should focus on this aspect and promote their product which gives Indian consumers a healthier option to carbonated beverages or sugar and preservative filled juices.

India's per capita consumption of beverages is very low compared to other markets. This presents Neera players with the opportunity to tap the huge untapped potential that this segment offers.

Neera Sugar, another natural product with no chemical process involved in its production, is emerging as an attraction in domestic and international markets. There is growing demand in the developed countries for coconut sugar as an alternative to refined cane sugar. Neera sugar is an unrefined sugar and is known to be rich in vitamins and minerals. Consumption of Neera sugar helps reduce & maintain weight, control & manage diabetes, helps lower serum cholesterol & risk of cardiovascular & coronary heart diseases. It is naturally rich in a number of key vitamins, minerals and phytonutrients, including potassium, zinc, iron and vitamins B1, B2, B3 and B6.

The companies in Kerala have already taken baby steps in this area and are already selling Neera at organized retail stores, stand-alone supermarkets, and canteens of hospitals. But that is not all what is needed. There needs to be a major push to place the product in the market.

The packaged Neera and Neera sugar segment is growing well and it is believed that it has growth potential, primarily due to quality, convenience and nutritive values. The companies should continue to undertake relevant initiatives to be able to meet the growing consumer demand and category opportunity. There is visibly no other product that has come this long as far as health benefits and taste is concerned. Undoubtedly we can say that Neera is revolutionizing the drinking habit of people across the world. ■

Coconut oil for health
past, present and future

Mike Foale

Coconut oil for health in the recent past

The milk produced in the kitchens of the tropical world from coconut kernel by shredding and extraction was added to dishes of every kind for nutrition and enhanced flavour. Coconut oil for frying was extracted from the milk by boiling, and it was this oil that got the attention of European traders when the demand for edible oil, and oil for soap-making, rose in Europe and the USA in the late 19th century.

The human population in those areas had increased rapidly, and along with the urbanisation that accompanied the industrial revolution there was a shortage of supply of the traditional animal sources of edible fats and oils (lipids). Coconut oil was embraced confidently for frying and as shortening in the West as it did not carry the health risk that was associated with some sources of animal fat in that era.

Once the popularity of coconut oil increased, it was imported at first from tropical market places which resulted in high demand and a rising price and investors in Europe turned to the development of coconut plantations. From the 1890s to the 1920s many hundreds of thousands of hectares of coconut plantations were established in a colonial context throughout the entire tropical world from the Pacific islands through Asia, Africa and the Caribbean. The supply of coconut oil to meet global demand was highly profitable for decades. Consumers in the west were enjoying the same benefits to health that were traditional in the regions of origin of this popular oil.

The second world war brought about radical change in supply as trade in coconut was interrupted. Coconut oil had established an appetite for a "safe" lipid from a plant source so the market turned to alternative sources. This was to deliver an almost fatal blow to the acceptance of coconut oil once trade resumed, because the suppliers of alternatives, in particular soybean oil in the United States, took advantage of confusion about the effect of particular types of lipid on health to oust coconut oil from that market. Many other countries followed suit though arguments supporting this.

The weapon used against coconut oil was the saturated fat hypothesis, developed in an atmosphere of anxiety over the health of the US president during the 1950s. The physician Ancel Keys presented selected data from seven countries in the World Health Organisation "country" database showing an association between dietary fat consumption and heart disease. High serum cholesterol was also associated with heart disease, and because total serum cholesterol rose when the diet was high in saturated fat, the conclusion was drawn that saturated fat was a primary cause of heart disease. The soy producers, who had gained a great market-share when coconut oil had been unavailable, during the war years, noted that coconut oil was a saturated fat. The American Soybean Association systematically ousted coconut oil from the market on the basis of this argument in spite of the high standing of coconut oil in healthy diets throughout the tropics and without a shred of clinical evidence to show that coconut oil in the diet was linked to heart disease.

The present status of coconut oil

Millions of dollars and many research reputations have been invested for decades in the

controversy generated by the saturated fat hypothesis. The policy against coconut oil and all lipids with a significant proportion of saturated fatty acids remains in place to this day. Medical practitioners and dieticians, trained in the era of "certainty" about the heart risk of saturated fat, remain unmoved. However, signs of uncertainty among some are beginning to appear, as a result of a massive body of evidence exonerating saturate lipids from a primary role in heart disease.

Supporters of the Saturated Fat Hypothesis (SFH) demand proof that coconut oil is not a risk to health, but the funding of a huge clinical study by coconut producers and processors is beyond their resources. The real question is, why should coconut oil wait for such a study when there is no proof that it is a risk to health. In fact, the body of evidence from many very large population studies points to saturated fat in general having been completely misrepresented.

One example of a failure to prove the Saturated Fat Hypothesis is the Women's Health Initiative study in the 1990s in the US in which 48,000 women were divided into two groups consuming either an "average" or a low fat diet. Those whose consumption was reduced by more than 20% of both total fat and saturated fat showed no advantage during a period of ten years, in the incidence of breast, colorectal, endometrial or ovarian cancers, or stroke, or heart disease. The evidence from several other studies is equally unsupportive of the saturated fat hypothesis. In spite of this, policy makers in the health and diet communities remain un-moved, expressing only irritation that such reports continue to be published.

Leading psychological researchers from the University of California, San Francisco have written, in relation to the issue of acceptance of new theories over old:

"In scientific work we find that new theories are understood only by the graduate students, whose intellectual identities are then wholly transformed. In contrast, the senior professors are burdened with such connectional inertia that when they encounter new ideas there is no apparent effect, other than an occasional vague irritation."

The future of coconut oil

A number of "game changers" have entered the arena of the engagement of coconut oil with the food market. Although refined coconut oil had experience popularity in the West for frying and use as shortening in the early 20th century, the attack of the unsaturated oil advocates has been extremely successful in reducing demand.

Refined Coconut Oil (RCO)had not been readily available and was also relatively expensive compared to other frying oils. There was need for a new element to transform the image of coconut oil so that consumer awareness, acceptance and eventually enthusiasm would be generated for its use. The primary game changer eventually came in the form of Virgin Coconut Oil (VCO), a product which had not been subjected, during its extraction, to high temperature and exposure to intermediate storage. The dried kernel of coconut, known as copra that was usually stored and transported to an industrial destination, yielded oil that requiring refining (RCO).

The market has embraced VCO, an oil produced from fresh mature nuts by three more-or-less equivalent processes which avoid high temperature. A traditional method of leaving fresh coconut milk, extracted from shredded kernel, for up to 48 hours, results in the spontaneous separation of the oil into a separate layer floating on the aqueous substrate, from which it is readily separated. A recently perfected method of separation employs the centrifuge to separate the oil in the same way that cream is separated from dairy milk. Thirdly, there are two versions of a method of pressing the oil from desiccated forms of shredded kernel. One requires the application of high pressure to extract the oil from traditional Desiccated Coconut (DC) of very low water content (below 5%) and this method includes cooling to avoid a pressure-induced sharp rise in temperature. The other pressure method takes advantage of the release at low pressure of oil from desiccated coconut at a water content of 10 to 12%. The choice of method depends upon the scale of operation, the quantity of resource readily available and the capacity of the local situation to attract investment.

While in some situations manufacturers of desiccated coconut, coconut milk and cream have met the demand of a significant market for many decades, there has also been, in many regions, a large coconut resource languishing in a state of under utilisation. Copra production had continued but the return-for-effort to the farmers and tenants was insufficient to stimulate conversion of the nut into copra. As a result there has been no interest in replanting, even though most palms are quite ancient, with low productivity.

VCO has changed the outlook, generating a pace of increase in demand which anticipates a gradual

switch of available resource from copra to VCO wherever investment capital is forthcoming. Replanting in order to expand the production resource in the most favourable situations, for increased VCO output, is already on the agenda.

The reason for the increased demand of virgin coconut oil could be its health benefits. Coconut Cures by Bruce Fife (2009) catalogue very many case histories reporting a large number of different conditions such as irritable bowel syndrome and many skin ailments which have been relieved by including VCO in the diet or applying it topically. There are also reports of relief from symptoms of dementia (Newport 2011) and Type 2 Diabetes (Turner et al 2009) and a connection in each of these reports to the active ketogenesis of VCO, opening up an area for future research to clarify the precise mechanism behind responses involving ketones. There is also evidence of relief of symptoms and reduction of virus load HIV AIDS when coconut oil is administered (Dayrit and Dayrit 2013) although this study awaits a follow-up using a larger sample size.

The second game changer is the publication in 2014 of a remarkable book -The Big Fat Surprise (Teicholz 2014) – a thoroughly researched account of how the Saturated Fat Hypothesis came into being and how it gave rise to controversial health policies, initially in the United States, but spreading far beyond through agencies such as the World Health Organisation. It is clear from this account that a policy of aversion to fat, particularly saturated fat, was promoted by the medical researcher Ancel Keys in the 1950s based on a selected data set. Through his position as the personal physician to the US President, Keys enjoyed great public support while grasping every available opportunity to protect his adopted policy and to dismiss the many efforts of other researchers to present an alternative hypothesis. The SFH was eagerly supported by the soybean industry as it opened the door to their product to be used wherever a food lipid was needed across the range from frying oil through salad dressing and shortening to margarine. The annual consumption of soybean oil per person in the USA rose during the 40-year period from 1959 to 1999 from 2kg to 12 kg. In the meantime the use of coconut oil fell from 0.8 kg to 0.4 kg per person, approximately.

An important element in the evidence against polyunsaturated fat presented by Teicholz (2014) is the trans fat story. Runny fats like soybean oil and canola, converted to firm margarine by partial hydrogenation, produced trans fats that have been shown to increase the risk of heart disease and carcinomas. Eventually, after a long campaign against trans fat by researchers including Enig (2000) it has been legislated that the food label in the US, and beyond, must now list the concentration of trans.

The sort of information presented in The Big Fat Surprise and elsewhere has greatly raised the confidence of the "converted" who have embraced VCO and are experiencing benefits in terms of their well-being. The dilema that remains, however is that many in the community do not feel confident or independent enough to question the advice given by many dieticians who have not kept up with developments in nutrition science or who are unable to accept information that contradicts a long-held belief, due to "connectional inertia" as described above.

The final game-changer will be in the future, as a new generation of health and diet professionals embraces the reported results of research and experience generated by the inclusion of VCO in the diet of ever more consumers. The coconut production and processing communities are already striving to meet demand for VCO. This suggests that as the demand continues its anticipated rise well into the future, the Coconut World, from the farmer, the harvester to the processor and marketer can expect to experience great prosperity.

The coconut world is undergoing "seismic" change due to a number of factors that are liberating coconut oil from the burden of rejection by the diet policy makers of major consuming nations. This first International Conference on Coconut Oil marks the beginning of an active new phase in advocacy and acceptance of coconut as one of the most valuable components of the human diet. Coconut processing interests have placed significant risk capital in the service of Virgin Coconut Oil and are reaping the reward for money well invested. The combined efforts of national governments, regional agencies such as the Asian and Pacific Coconut Community, coconut growers throughout the world, and the processors and marketers who are already "ahead of the game", are expected to lead to a healthier future for the whole human race through the increased use of coconut oil. Governments of producing countries may also need to pay attention to the situation of local low-income consumers now faced with a rise in the price of their daily diet component of coconut, as the exporters have raised the price paid to the farmer. ■

* *Mike Foale is Honorary Research Fellow, School of Agriculture and Food Sciences, University of Queensland, Australia*

Source: COCOINFO INTERNATIONAL, VOL. 22, No. 1, 2015

12.75 % rise in export of Indian coconut products

K.S. Sebastian, *Assistant Director (Export Promotion), CDB, Kochi-11*

Export of coconut products during the first four months of 2015-16 was reported to be worth Rs.491 crores. Compared to the export during the corresponding period of 2013-14, the increase was 12.75 %. Significant increase was recorded in the export of virgin coconut oil, activated carbon, dry coconut and coconut oil. Details of export of coconut products from India during the period, April to July 2015 are given in table1.

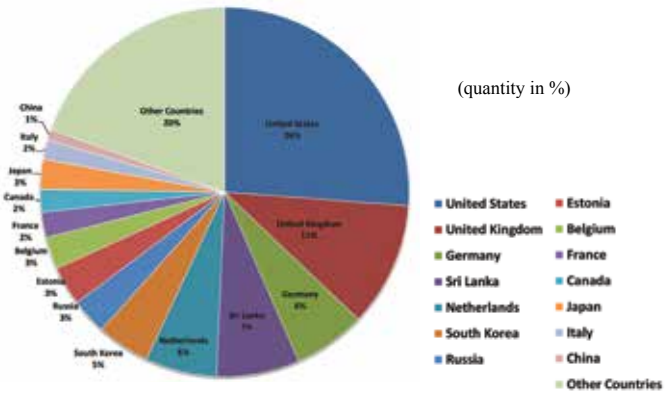
table1

Export of coconut products from April to July 2015

Items	April		May		June		July		Total	
	Qty (in MT)	Value (Rs. In lakhs)	Qty(in MT)	Value (Rs. In lakhs)	Qty(in MT)	Value (Rs. In lakhs)	Qty(in MT)	Value (Rs. In lakhs)	Cumula-tive Qty(in MT)	Cumulative Value(Rs. In lakhs)
Activated Carbon	5352.88	5456.01	5294.54	5548.47	5943.31	6242.73	5050.67	5434.76	21641.39	22681.97
Coconut Fatty Soap		253.72		236.52		207.60		252.54		950.38
Hair Cream		27.95		91.87		123.86		59.45		303.13
Coconut Oil	593.01	1249.24	814.07	1708.96	762.02	1654.75	402.29	841.75	2571.38	5454.70
Coconut Water		46.51		45.87		94.54		13.75		200.66
Copra	151.46	151.92	190.24	192.54	275.40	250.84	678.44	552.80	1295.53	1148.11
DC	318.26	477.04	236.75	345.55	276.65	420.24	90.06	159.00	921.71	1401.83
Dry coconut	1993.13	2266.53	989.20	1091.10	2085.05	2017.34	2004.71	1916.02	7072.08	7290.99
Fresh coconut	2443.21	909.52	3679.79	1305.20	2523.82	961.28	2704.01	1009.68	11350.83	4185.67
Grated/sliced coconut	140.48	302.45	121.76	335.22	182.06	306.10	193.99	431.99	638.30	1375.75
Oval coconut shell	123.20	71.28	82.02	58.17	128.33	93.41	125.51	101.33	459.06	324.20
Shell charcoal	639.60	207.26	421.92	141.02	691.57	236.16	701.90	247.93	2454.99	832.37
VCO	143.79	458.00	137.01	442.78	83.80	266.41	29.38	133.06	393.99	1300.26
Misc coconut products		457.43		323.50		539.26		348.29		1668.48
Total		12334.86		11866.76		13414.54		11502.35		49118.51

Activated Carbon

The export of activated carbon from India during the period April to July 2015 was 21641 metric tonnes. United States was the major importer of Indian activated carbon, followed by United Kingdom. Details of countries imported Activated Carbon from India is given in table 2



Country wise export of Activated Carbon during April to July 2015 *table 2*

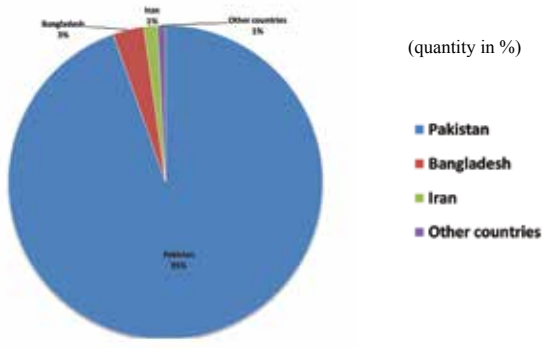
Country	Qty (in MT)	Value (Rs in lakhs)
United States	5666.25	5850.53
United Kingdom	2361.08	2459.24
Germany	1369.90	1539.60
Sri Lanka	1574.70	1595.75
Netherlands	1358.10	1307.53
South Korea	1008.50	1228.30
Russia	679.00	732.60
Estonia	740.00	750.62
Belgium	612.60	622.54
France	479.80	684.62
Canada	431.00	452.49
Japan	564.70	530.43
Italy	368.50	351.82
China	207.88	279.19
Other Countries	4219.38	4296.70
Total	21641.39	22681.97

Dry Coconut

During the first four months of the finanical year 2015-16, 7072 metric tonnes of dry coconuts were exported from India. Of this Pakistan imported 6689 metric tonnes. Export of this product during the corresponding period of the previous year was 5828 metric tonnes. Details of countries imported dry coconut from India is given in table 3.

table 3

Export of dry coconut during April to July 2015		
Country	Qty (in MT)	Value (Rs in lakhs)
Pakistan	6688.75	6841.32
Bangladesh	225.00	188.98
Iran	100.00	113.43
Other countries	58.33	147.26
Total	7072.08	7290.99

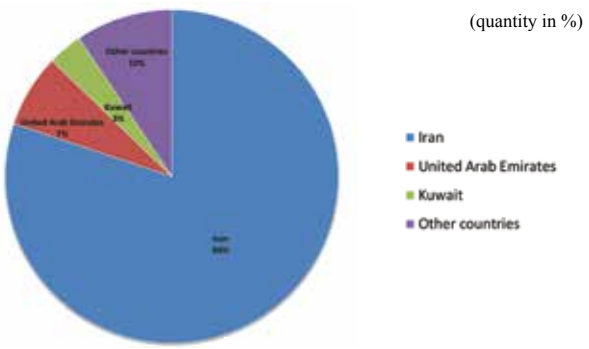


Desiccated Coconut

The export of desiccated coconut recorded during the period from April 2015 to July 2015 was 922 metric tonnes, compared to 981 metric tonnes during the corresponding period of previous year. Iran is the major importer of this product from India. Details of countries imported desiccated coconut from India is given in table 4.

table 4

Export of DC from India during April to July 2015		
Country	Qty (in MT)	Value (Rs in lakhs)
Iran	738.50	1117.90
United Arab Emirates	65.51	92.19
Kuwait	30.98	46.41
Other countries	86.73	145.33
Total	921.71	1401.83

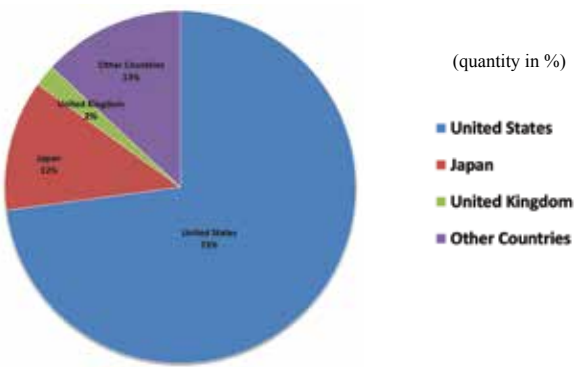


Virgin Coconut Oil

Export of virgin coconut oil from India during the first four months of the financial year 2015-16 was to the tune of 394 metric tonnes. United States alone imported 287 metric tonnes of VCO from India. During the corresponding period last year, the import was only 83 metric tonnes. Details of import of virgin coconut oil from India is given in table 5.

table 5

Export of VCO from India during April to July 2015		
Country	Qty(in Kg)	Value(in Rs.)
United States	287.16	914.32
Japan	47.37	107.27
United Kingdom	7.93	26.67
Other Countries	51.54	251.99
Total	393.99	1300.26



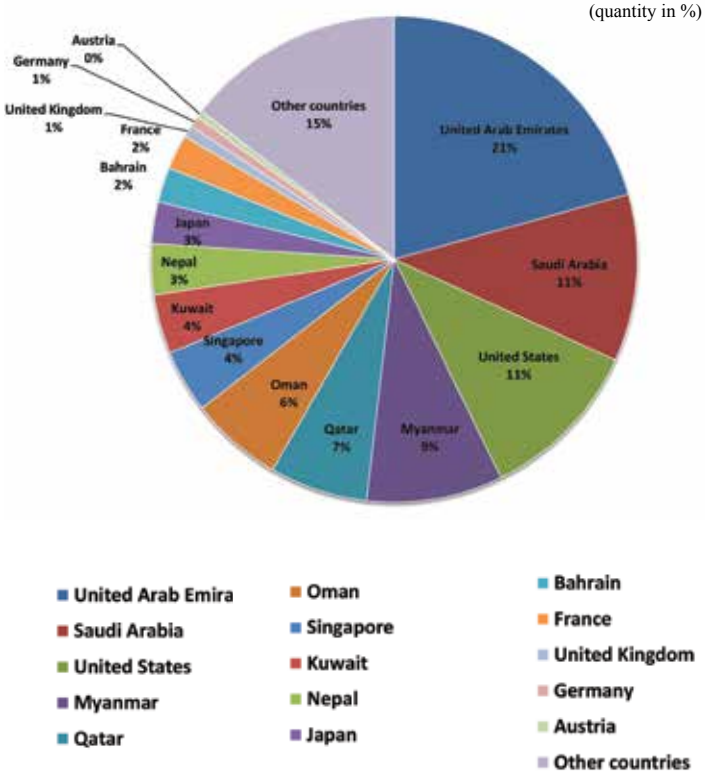
Coconut Oil

Export of coconut oil from India during the first four months of the financial year 2015-16 was 2571 metric tonnes, compared to 1906 metric tonnes recorded during the corresponding period of 2013-14. UAE alone imported 532 metric tonnes of coconut oil. Coconut oil is also exported for edible purpose to Saudi Arabia, United States, Myanmar, Qatar, Oman, Singapore, Kuwait, etc. Details of import of coconut oil from India is given in table 6.

table 6

Export of coconut oil during April to July 2015		
Country	Qty (in MT)	Value (Rs in lakhs)
United Arab Emirates	532.13	1133.36
Saudi Arabia	285.65	611.94
United States	281.84	639.68
Myanmar	232.63	542.43
Qatar	168.21	370.72
Oman	158.90	329.21
Singapore	107.32	254.65
Kuwait	101.56	220.26
Nepal	86.92	202.38
Japan	70.80	152.92
Bahrain	60.37	130.56
France	58.91	125.28
United Kingdom	20.22	45.40
Germany	18.99	40.87
Austria	12.23	26.00
Other countries	374.72	629.04
Total	2571.38	5454.70

(quantity in %)



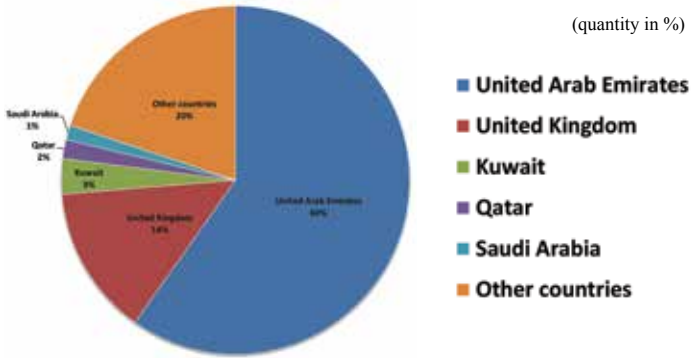
Fresh Coconut

Export of husked coconut from India during the first four months of 2015-16 was 11351 metric tonnes. Major portion of export was to UAE. Details of import of fresh coconut from India is given in table 7.

table 7

Export of fresh coconut during April to July 2015		
Country	Qty(in MT)	Value(Rs in lakhs)
United Arab Emirates	6767.04	2671.25
United Kingdom	1576.15	580.45
Kuwait	371.29	146.48
Qatar	197.35	85.51
Saudi Arabia	153.27	59.02
Other countries	2253.33	177.88
Total	11350.83	4185.67

(quantity in %)



Import

During the first four months of the financial year 2015-16 , India imported Rs. 129 crores worth coconut products. Coconut fatty acid, copra expeller cake and coconut shell charcoal are the major items of import. Details of import of coconut products into India during the first four months of 2015-16 is given in table 8.

table 8

Monthly import of coconut products in to India (2015-16)										
Item	April		May		June		July		Total	
	Qty (in MT)	Value (Rs. in lakh)	Qty (in MT)	Value (Rs. in lakh)	Qty (in MT)	Value (Rs. in lakh)	Qty (in MT)	Value (Rs. in lakh)	Cumulative Qty (in MT)	Cumulative Value (Rs. In lakhs)
Coconut fatty acid	378.24	328.45	892.56	783.84	640.67	560.18	768.36	648.23	2679.83	2320.70
coconut oil	551.39	634.10	405.04	287.58	244.31	178.34	113.17	113.06	1313.90	1213.09
Copra oil cake	8231.06	1271.29	11119.59	1679.95	10254.64	1654.23	11766.99	1897.05	41372.27	6502.52
Coconut shell charcoal	1870.17	608.52	1320.69	407.29	1641.10	495.84	853.74	257.87	5685.70	1769.53
Cream-milk-powder		98.75		103.59		74.68		209.97		486.99
Copra	24.42	17.47	50.00	38.91	0.00	0.00	48.84	36.41	123.27	92.79
Misc coconut products		40.62		102.54		238.09		155.06		536.32
Total		2999.21		3403.69		3201.38		3317.66		12921.93

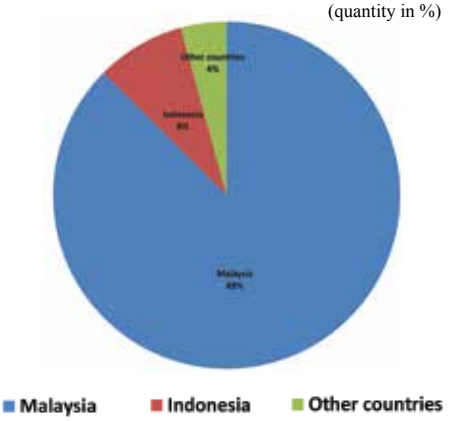
Coconut Fatty Acid

Import of coconut fatty acid into India during the first four months of the financial year 2015-16 was 2680 metric tonnes, out of which 2344 metric tonnes was from Malaysia. Details of import of coconut fatty acid in india is given in table 9.

table 9

Import of coconuto fatty acid to India during April to July 2015		
Country	Qty(in MT)	Value(Rs.in lakhs)
Malaysia	2343.54	2006.54
Indonesia	222.01	198.53
Other countries	114.28	115.63
Total	2679.83	2320.70

(quantity in %)



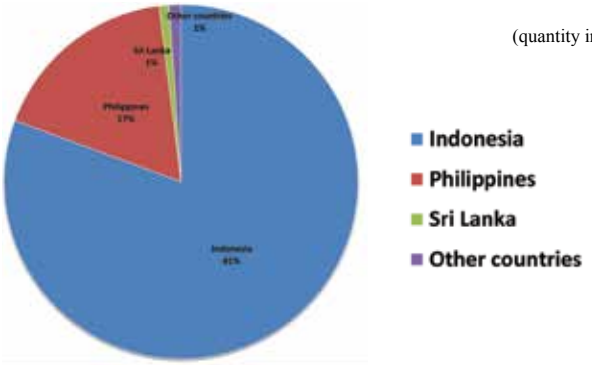
Copra expeller cake

One major item of import among coconut products is copra expeller cake. During the period from April to July 15, quantity of import of this product was 41372 metric tonnes. Details of import of this product is given in table 10.

table 10

Import of coconutoil cake to india during April to July 2015		
Country	Qty(in MT)	Value (Rs. In lakhs)
Indonesia	33349.83	5254.97
Philippines	7200.00	1114.48
Sri Lanka	383.12	84.74
Other countries	439.33	59.65
Total	41372.27	6513.84

(quantity in %)

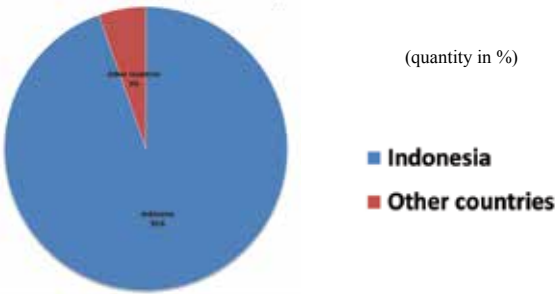


Coconut Oil

Import of coconut oil into India during the first four months of the financial year was 1314 metric tonnes. Highest import recorded was from Indonesia, which was 1243 metric tonnes. Details of countries from where India imported coconut oil are given in table 11.

table 11

Import of coconut oil to india during April to July 2015		
Country	Qty(in MT)	Value (Rs. In lakhs)
Indonesia	1242.82	1137.72
Other countries	71.08	75.37
Total	1313.90	1213.09

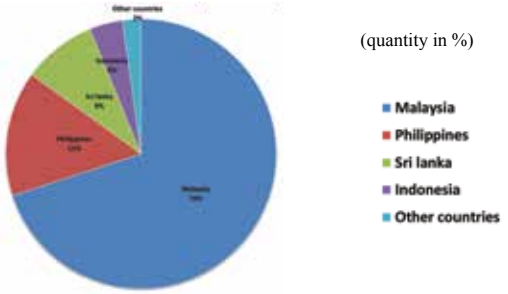


Coconut Shell Charcoal

Import of coconut shell charcoal into India during the first four months of the financial year 2015-16 stood at 5686 metric tonnes. The highest import was recorded from Malaysia. Details of import of coconut shell charcoal is given in table 12.

table 12

Import of coconut shell charcoal to india during april to july 2015		
Country	Qty(in MT)	Value (Rs. In lakhs)
Malaysia	3978.79	1250.70
Philippines	853.74	257.87
Sri lanka	503.36	157.27
Indonesia	223.74	58.62
Other countries	126.07	45.06
Total	5685.70	1769.53



Central Board of Excise & Customs revises the rate of exchange of foreign currencies

GOVERNMENT OF INDIA, MINISTRY OF FINANCE, (DEPARTMENT OF REVENUE)
(CENTRAL BOARD OF EXCISE AND CUSTOMS)
Notification No.81/2015 - Customs (N.T.) Dated the 20th August, 2015

In exercise of the powers conferred by section 14 of the Customs Act, 1962 (52 of 1962), and in super session of the notification of the Central Board of Excise & Customs No.73/2015-CUSTOMS (N.T.), dated 6th August, 2015, except as respects things done or omitted to be done before such supersession, the Central Board of Excise & Customs hereby determines that the rate of exchange of conversion of each of the foreign currencies specified in column (2) of each of Schedule I and Schedule II annexed hereto, into Indian currency or vice versa, shall, with effect from 21st August, 2015, be the rate mentioned against it in the corresponding entry in column (3) thereof, for the purpose of the said section, relating to imported and export goods.

SCHEDULE-I			
Sl. No.	Foreign Currency	Rate of exchange of one unit of foreign currency equivalent to Indian rupees	
(1)	(2)	(3)	
		(a)	(b)
		(For ImportedGoods)	(For Export Goods)
1.	Australian Dollar	48.65	47.25
2.	Bahrain Dinar	177.80	168.05
3.	Canadian Dollar	50.25	49.20
4.	Danish Kroner	9.85	9.60
5.	EURO	73.45	71.65
6.	Hong Kong Dollar	8.50	8.35
7.	Kuwait Dinar	221.95	209.55
8.	New Zealand Dollar	43.70	42.55
9.	Norwegian Kroner	7.95	7.75
10.	Pound Sterling	103.35	101.10
11.	Singapore Dollar	47.05	45.95
12.	South African Rand	5.20	4.90
13.	Saudi Arabian Riyal	17.90	16.90
14.	Swedish Kroner	7.75	7.55
15.	Swiss Franc	68.30	66.70
16.	UAE Dirham	18.25	17.25
17.	US Dollar	65.75	64.70

SCHEDULE-II			
	Foreign Currency	Rate of exchange of 100 units of foreign currency equivalent to Indian rupees	
(1)	(2)	(3)	
		(a)	(b)
		(For Importe Goods)	(For Export Goods)
1.	Japanese Yen	53.20	52.05
2.	Kenya Shilling	65.00	61.30

Domestic quarantine umbrella to prevent spread of root (wilt) disease to be strengthened

Regi J. Thomas, A. Joseph Rajkumar, M. Shareefa and Merin Babu,
ICAR-CPCRI Regional Station, Kayamkulam,Krishnapuram P.O., Alappuzha- 690 533

Coconut root (wilt) disease is now contiguously prevalent in eight southern districts of Kerala and sparse occurrence of this disease has also been reported from the remaining six districts. Root (wilt) disease (RWD) has also been reported from parts of Tamil Nadu and Karnataka, adjoining Kerala State. The disease is caused by Phytoplasma and transmitted by lace bug and plant hopper. ICAR-CPCRI has recommended strict quarantine regarding movement of coconut planting materials from disease affected areas to disease-free areas to contain the spread of the disease. Nowadays domestic migrant labourers working in Kerala and hailing from Eastern and North-Eastern states carry coconut seedlings during their visit to respective home states. This should be viewed seriously taking into account the exploding population of domestic migrant labourers from other states and the possibility of spread of root (wilt) disease of coconut to those states which are hitherto disease-free.

It is estimated from a survey conducted during 2013 that there are over 25 lakh domestic migrant labour workers in Kerala today with an annual arrival rate of 2.35 lakhs. The study shows that over 75 per cent of the domestic migrant labourers come from five states, namely West Bengal, Bihar, Assam, Uttar Pradesh and Odisha. In this context, it is important to note that five states namely Assam, Odisha, Bihar, West Bengal and Mizoram contribute to 5% of the total area under coconut and contributing 6% of the total coconut production. Coconut Development Board is giving thrust to area expansion in non-traditional areas especially North-East and at present this area is free of root (wilt) disease of coconut.

If we consider the fact that migrant domestic labourers from Eastern and Northern Eastern states

visit their home states at least once a year and anticipating the fact that atleast 0.1% of them carry coconut seedlings while they travel to their home state, there is every chance to panic as they are most likely to carry root (wilt) disease affected seedlings to their home states. Even if a small population of 2500 migrant labourers annually carry coconut seedlings from Kerala there is likelihood of spread of root (wilt) disease to Eastern and North-Eastern India.

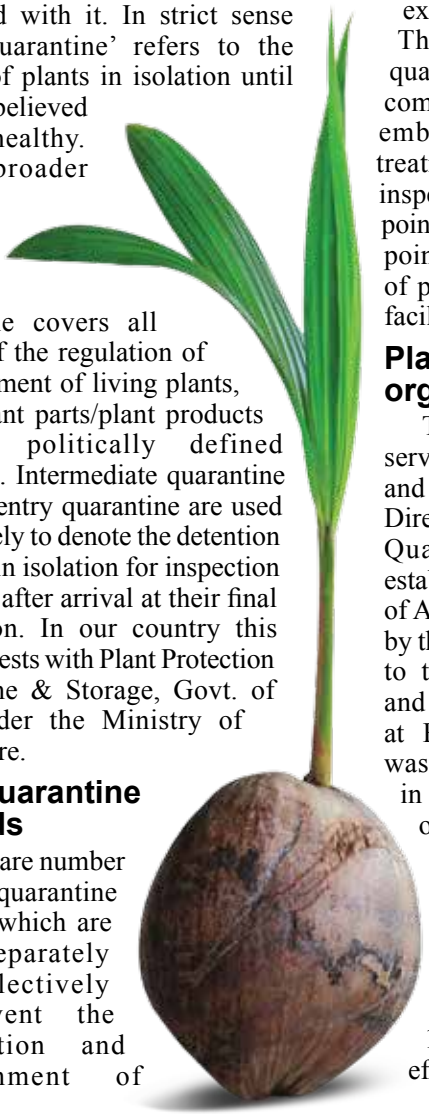
According to the survey conducted in Kerala during 1984, the disease causes an annual loss of 968 million nuts. In the contiguously diseased area, vast majority of palms have turned senile and unproductive to the disease. Hence, accidental introduction of root (wilt) disease in Eastern/North-Eastern India will be catastrophic to coconut cultivation in those areas, and will adversely affect the area expansion in non-traditional areas. Need for domestic quarantine to contain spread of root (wilt) disease of coconut was highlighted during early 80s. This article highlights the impact of accidental introduction of root (wilt) disease to Eastern/North-Eastern India and strategies to be adopted for strengthening domestic quarantine umbrella in Kerala specifically with regard to coconut seedling so as to arrest the spread of root (wilt) disease to those states.

Plant Quarantine

The term 'Quarantine', a Venetian dialect, means simply forty i.e., 40 days. This was more commonly referred to the period of detention for ships arriving from countries subject to epidemic diseases like cholera, plague and yellow fever. The crew and the passengers were compelled to remain isolated on board for sufficient period to permit the diseases to develop and later be detected. Later on, the term 'Quarantine' came to be used for the detention and the practices connected with it. In strict sense 'Plant Quarantine' refers to the holding of plants in isolation until they are believed to be healthy. Now, broader meaning of the plant quarantine covers all aspects of the regulation of the movement of living plants, living plant parts/plant products between politically defined territories. Intermediate quarantine and post-entry quarantine are used respectively to denote the detention of plants in isolation for inspection during or after arrival at their final destination. In our country this mandate rests with Plant Protection Quarantine & Storage, Govt. of India under the Ministry of Agriculture.

Table 1.

Seaports	Airports	Land frontiers
Bhavnagar - Gujarat	Amritsar - Punjab	Amritsar Railway Station - Punjab
Kolkatta - West Bengal	Kolkatta - West Bengal	Attari Railway Station - Punjab
Chennai - Tamil Nadu	Chennai - Tamil Nadu	Attari-Wagah Border- Punjab
Kochi - Kerala	Hyderabad- Telengana	Bangaon Benapol Border - West Bengal
Mumbai - Maharashtra	Mumbai - Maharashtra	Gede Road Railway Station - West Bengal
Nagapattinam - Tamil Nadu	New Delhi	Kalimpong - West Bengal
Rameswaram - Tamil Nadu	Patna - Bihar	Sukhia Pokhri - West Bengal
Tuticorin - Tamil Nadu	Tiruchirappalli - Tamil Nadu	
Visakhapatnam - Andhra Pradesh	Thiruvananthapuram - Kerala	
	Varanasi- Uttar Pradesh	



Plant quarantine methods

There are number of plant quarantine methods which are used separately or collectively to prevent the introduction and establishment of exotic pests and pathogens. The components of plant quarantine activities include complete embargoes, partial embargoes, inspection & treatment at point of origin, inspection and certification at point of origin, inspection at the point of entry and utilization of post entry plant quarantine facilities.

Plant quarantine organizations in India

The plant quarantine service is centrally organized and administered through the Directorate of Plant Protection, Quarantine and Storage established under the Ministry of Agriculture which is headed by the Plant Protection Adviser to the Government of India and having its headquarters at Faridabad (Haryana). Seed was not originally included in the DIP Act, but because of the changing situation and to meet the current requirements, the Government of India passed the Plants, Fruits, Seeds (Regulation of Import into India) Order 1984 which came into effect in June 1985.

Agencies involved in plant quarantine

The authority to implement the quarantine rules and regulations framed under DIP Act rests basically with the Directorate of Plant Protection, Quarantine & Storage, under the Ministry of Agriculture. This organization handles bulk import and export of seed and planting material for commercial purpose. Under this organization nine seaports, 10 airports and seven land frontiers are functioning. These are the recognized ports for entries for import of plant and plant material. The names and places of the ports and stations are given in Table 1.

The Government of India has also approved three other national institutions to act as official quarantine agencies, especially for research material.

I. National Bureau of Plant Genetic Resources (NBPGR)

The NBPGR in New Delhi and its regional station at Hyderabad are the agencies involved in processing of germplasm, seed, plant material of agricultural, horticultural, and silvicultural crops of all the institutions of Indian Council of Agricultural Research (ICAR) functioning in the country. It is also responsible for quarantine clearance of seed and plant material received from International Agricultural Research Centers viz., ICRISAT, ICARDA, CIMMYT, etc. The quarantine clearance of all its exchanges was handled by formerly Central Plant Protection Training Institute (rechristened as National Institute of Plant Health Management, Hyderabad) of Directorate of Plant Protection, Quarantine & Storage, until July 1986. This authority was later passed on to NBPGR in August 1986.

II. Forest Research Institute (FRI), Dehra Dun, for forestry plants and III. Botanical Survey of India (BSI) for other plants.

Quarantine inspection, treatment and certification procedures Inspection: Inspection of plant material is an important part of plant quarantine procedure, and may be done both in the exporting country, before issue of a health certificate and after arrival to detect any pest or disease which may have become evident during transit. Publications like manuals and hand books on individual organisms of quarantine importance are prepared with illustration by each country / region to help inspectors.

The plant quarantine service is centrally organized and administered through the Directorate of Plant Protection, Quarantine and Storage established under the Ministry of Agriculture which is headed by the Plant Protection Adviser to the Government of India and having its headquarters at Faridabad

General points for strict adherence

- Review the status of existing domestic quarantine for establishment of interstate quarantine check-posts to monitor movement of pests of significance as well as movement of planting materials especially in sensitive zones.
- Quarantine check posts should be invariably present in all inter-state bus terminal or railway stations to arrest the movement of planting materials.
- Review the national regulatory framework and develop a mechanism for distribution or sale of pest-free planting material within the country, by all agencies involved in the distribution of planting materials / seeds.
- Compulsory seed certification mechanism to ensure the supply of pest-free seed/planting materials.
- Develop an early warning system and rapid response team to curtail spread/ eradicate the recently introduced pests in an area so as to contain further spread and establishment.
- Amend the Biological Diversity Act 2002 for making provisions to check international/ interstate movement of invasive pests and to harmonize the Act with the quarantine and Export-Import (EXIM) regulations for implementation.

Certification

Phytosanitary or health certificate is a certificate which should accompany a plant or plant material or seed which is to be moved from one place to another place. This certificate indicates or certifies that the material under transit is free from pests or diseases. In addition, a pest-risk analysis has now become mandatory for the import of any planting materials from other countries.

Strengthening domestic quarantine

Under the DIP Act, the Directorate of Plant Protection, Quarantine and storage has the responsibility to take the necessary steps and regulate the inter-state movement of plants and plant material in order to prevent the further spread of destructive insects and diseases that have

already entered the country. The sole object of enforcing domestic quarantine is to prevent the spread of these diseases from infected to non-infected areas. Currently, domestic plant quarantine exists in four diseases, wart (Synchytrium endobioticum) of potato from 1959, bunchy top (virus) of banana from 1959, mosaic (virus) of banana from 1961 and apple scab (Venturia inaequalis) from 1979. Most of the states in India have plant quarantine laws to avoid entry of plant pests and diseases.

In Tamil Nadu as per Madras Pests and Diseases Act of 1919, quarantine regulations are periodically enforced. e.g., cardamom mosaic disease prevalent in Anamalai area of Coimbatore District is absolutely free in Nelliampatti area. Hence, the movement of diseased plant material from Anamalai to Nelliampatti area is prevented through enforcing strict domestic quarantine. Furthermore, movement of potatoes from Nilgiris (Ooty) to other parts of Tamil Nadu as planting material was successfully curtailed by effective implementation of domestic quarantine and thereafter arrested the spread of cyst nematodes.

Limitations

There are many limitations in implementing domestic plant quarantine in India due to the vastness of the country and the unrestricted movement of plant material from one state to another. As a result, diseases like bunchy top and mosaic of banana have spread to several other states. However, the wart disease, cyst nematode of potato, and scab of apple are restricted in the states where they were initially noticed.

In view of the difficulties in diagnosis of the root (wilt) disease of coconut, phytosanitary certification would not seem to offer adequate protection. Moreover, as such there is no treatment available for the elimination of the pathogen from the planting material, the transportation of the seedlings from the disease endemic-areas need to be strictly prohibited as we know that strict quarantine is the only way to prevent the spread of this disease. Therefore, careful watch (domestic quarantine) and banning the movement of coconut seedlings from Kerala atleast in the railway stations of disease endemic tract (Thiruvanathapuram to Thrissur) should be implemented so that the RWD will not reach North-East immediately. A sensitive vigil and awareness campaign to all railway authorities concerned would be the need of the hour. Red alert should also be made in Inter-State Bus Terminal complex restricting the movement of coconut seedlings to nearby states as well. Prevention would be the key factor to avoid entry of this debilitating malady (RWD) of coconut into the Eastern and North Eastern India. ■

A domestic migrant labourer at Thiruvalla railway station ready for departure . (Inset: Proutista moesta, a vector of RWD, feeding on coconut seedlings)

Though DIP Act calls for effective implementation of domestic quarantine it is not scrupulously followed. Some of the key issues in coconut that warrants domestic quarantine are

- Movement of planting materials (seedlings/seed nuts) from RWD zones of Kerala to other States. In this process, the invasive pest, Myllocerus undatus prevalent in RWD zones could also be introduced in other regions.
- Movement of planting materials (seedlings/seed nuts) from Andaman and Nicobar Islands so as to arrest the introduction of foliar pest in coconut nursery, Chrysomelid beetle Wallacea sp. prevalent in Port Blair and Little Andaman to the main land and vice-versa as the Bay Island is more or less free from coconut eriophyid mite, Aceria guerreronis .

Govt to Distribute 10 Lakh Dwarf Palms in a Year: Oommen Chandy

Shri. Oomen Chandy, Chief Minister of Kerala, inaugrating the Neera Plant at Kuttiyadi in Kozhikode

Chief Minister Shri. Oommen Chandy inaugurated the third Neera production plant in Kerala at Maruthonkara near Kuttiyadi in Kozhikode. The plant, set up by Kuttiyadi Coconut Farmers' Producer Company Limited, is one of the largest units registered under Coconut Development Board (CDB) with a production capacity of 8,000 litres per day. "The subsidy announced for the Neera production societies in the State would be made available without any delay. A government order to that effect had been issued in as early as June" said the Chief Minister while inaugurating the Neera plant.

Shri. Oommen Chandy also promised to take necessary measures to overcome the shortage of Neera technicians in the state by giving training to more people. He further said that the government would look into the possibilities of making adequate fund available for the training programme.

Chief Minister urged CDB to popularise hybrid dwarf varieties of coconut trees to overcome the shortage of Neera technicians. He urged CDB to plant at least a few lakh dwarf coconut trees in a time-bound manner with the help of farmers. Realising the difficulties, the minister also said that the government would distribute 10 lakh dwarf variety coconut palms per year for the next five years.

Presiding over the function, Kuttiyadi Coconut Farmers' Producer Company Limited President Shri. Babu Mannath said the high attrition rate among the Neera technicians was a major challenge the sector was facing now. He also commented that their desertion after taking the expensive training is also causing a huge financial loss to the sector.

The Kuttiyadi Neera plant, which is in two acres of land at Mundavayal in Maruthonkara panchyat, has a daily capacity of producing around 8,000 litres per day. However, the plant would produce only around 1000 litres initially due to the shortage of trained hands and other technical reasons.

Shri Oommen Chandy inaugurated the Neera distribution and distribution of remuneration to Neera technicians. Shri. Mullappally Ramachandran, MP, laid the foundation stone of the coconut oil plant planned as part of the project and offered Rs 25 lakhs for the company. Shri E.K. Vijayan MLA distributed the remuneration to coconut farmers. Shri C.K. Nanu MLA distributed the remuneration to Coconut Producer's Federations and Shri Joy Oommen, CMD, KFC inaugurated the distribution of Neera value-added products. Shri T.K. Jose IAS, Chairman, Coconut Development Board; Smt. K.K. Lathika, MLA and Shri Shajahan Kanjiravilayil, Chairman, Consortium of Coconut Producer's Companies in Kerala were also present at the occasion.

The Neera Plant at Kuttiyadi CPC, Kozhikode

CDB conducts national level World Coconut Day 2015 celebration at Vijayawada, Andhra Pradesh

Coconut Development Board conducts the national level World Coconut Day 2015 celebration in Andhra Pradesh at Swarna Vedika, M G Road, Vijayawada on 2nd September 2015. The theme announced by APCC for this year's World Coconut Day is 'Coconut for Family Nutrition, Health & Wellness.

Every year 2nd September is celebrated as World Coconut Day to commemorate the formation day of Asian Pacific Coconut Community (APCC). APCC is an intergovernmental organisation of 18 member countries mandated to promote, coordinate and harmonize coconut developmental activities of the Asian Pacific region to achieve maximum economic development. India is one of the founder members of APCC. In India, World Coconut Day is celebrated every year under the aegis of Coconut Development Board in various coconut growing states across the country.

As per the latest statistics of Horticulture Division, Dept. of Agriculture & Cooperation, Ministry of Agriculture and Farmer's Welfare, Govt. of India for coconut for the year 2013-14, the state of Andhra Pradesh occupies the first position in coconut productivity (14997 nuts /ha) and the fourth positions both in area (1,21,920 ha) and production (1828.46 million nuts) among the major coconut growing southern states in India.

Since 1990, CDB has been implementing various developmental schemes in the state of Andhra Pradesh for expansion of area under coconut, improving the production and productivity of coconut holdings and promoting value addition and marketing of coconut. Presently, CDB has also facilitated the formation of three tier Farmer Producer Organizations (FPOs) with the objective of aggregation of farm produce, farm level primary processing, value addition and marketing for augmenting the income of small and marginal coconut farmers. As on date, 610 Coconut Producer Societies, 49 Coconut Producer Federations and three Coconut Producer Companies are formed in the state of Andhra Pradesh. Further, CDB has set apart Rs. 1284.32 lakhs for implementing various developmental schemes in the state during the year 2015-16.

Around 500 coconut farmers representing all coconut growing states in the country will be participating in the programme out of which 75% of farmers are invited from Andhra Pradesh. The meeting is expected to be a good platform for the coconut farmers to update their knowledge and exchange ideas on coconut situation prevailing in the country.

An exhibition will also be held as part of the world coconut day celebrations of the Board, wherein prospective coconut entreprenuers and Coconut Producer Companies will be displaying their products and services.

Coconut Development Board is also conducting World Coconut Day celebrations across the country through its Regional Offices, State Centers and Farms.

Retirement

Shri.Balram Prasad Dhruvanshi, MTS took voluntary retirement from the services of the Board on 1st March 2015. He joined the Coconut Development Board in November 1989.

Shri. K Ganga Raju, MTS retired from the services of Coconut Development Board on 30th April 2015 on superannuation. He joined the Board in April 1997.

CDB supplied Neera, Virgin Coconut Oil in South Africa for independence day celebration

Coconut Development Board shipped Neera, virgin coconut oil and other value-added products to South Africa for distribution in South Africa on August 15th 2015 - Independence day celebrations as well as in the India Golf Day. The consignments were send as per the requests of Smt. Ruchi Ghanashyam IFS, High Commissioner, High Commission of India, South Africa.

Board sent goods worth 260 kg with sufficient quantity of coconut oil, neera honey, sugar, other value added products such as spicy jaggery, jaggery, virgin coconut oil, and coconut chips along with promotional literatures and brochures regarding the products for distribution in the events. The consignments included VCO produced by Keratech, coconut chips from Kodungallur Coconut Producer's Company Ltd and Nerra and Neera products developed by CDB Institute of Technology, Vazhakkulam, Aluva.

This co-operation is expected to bring value-added coconut products from India to the forefront of global market and would ultimately benefit the coconut farmers of India. This exchange is also expected to develop a fruitful collaboration between the Coconut Producers and their FPOs in India with potential consumers in South Africa.

Retirement

Shri. Vijayakumar Hallikeri , Deputy Director, Regional Office, Bangalore took voluntary retirement from the service of Coconut Development Board on 11th May 2015. He joined Coconut Development Board in March 1987.

Shri. T.K. Jose IAS, Chairman, CDB, hoisting the national flag as part of independence day celebration of CDB

Monthly operations in September

Andaman & Nicobar Islands: Plough in the green manure crop and incorporate it into the soil. Apply organic manure such as dried compost /cow dung/ poultry manure @ 25 kg/tree in the basin taken around the palm. Cover the manure with soil. New planting of quality seedlings can be undertaken now. Prevent accumulation of rain water in the seedling pits. Clove, nutmeg, cinnamon, pepper and banana can be planted in the inter spaces. Control rhinoceros beetle by adopting IPM package consisting of extraction of beetle using a beetle hook from the affected palm, proper disposal of breeding materials of the beetle and biological suppression using microbial agents like Baculovirus of Oryctes and Metarhizium anisopliae. Incorporation of the weed plant Cleodendron infortunatum in the breeding grounds has been found effective as it disrupts larval development and finally reduces pest population. Fill the youngest three leaf axils with a mixture of 250g powdered marotti/neem cake with equal volume of sand or deposit 10 gm naphthalene ball (4 balls) per palm and cover with sand.

Andhra Pradesh : Plough the land and sow cowpea or any pulse crop or vegetable crops. If stem bleeding disease is noticed: (1) remove the affected bark tissues on the stem and apply 5 per cent calixin on the wound and also apply warm coal tar, (2) root feed the affected palm with 5 percent calixin @100ml solution at quarterly intervals, (3) apply 5 kg neem cake per palm per year along with the organic manure; and (4) provide drainage during rain and irrigate during summer. If the attack of the mite is noticed, spray neem oil - garlic - soap emulsion 2 percent (20 ml neem oil + 20 gm garlic emulsion + 5 gm soap in 1 litre water) or commercial botanical pesticides containing azadirachtin 0.004 per cent @ 4ml per litre of water on bunches, especially on the perianth region of buttons and affected nuts or root feed neem formulations containing azadirachtin 5 per cent @ 7.5 ml with equal volume of water.

Assam : Apply the second dose of fertilizers @ 334 g urea, 666 g single super phosphate(SSP) and 666g muriate of potash(MOP) with neem cake @ 5 kg/palm/ year in the coconut basin. Remove ungerminated nuts and dead sprouts from the nursery. Slow growing and late germinated seedlings are to be removed from the nursery. Apply vermicompost/cowdung @ 25-50 kg for each adult coconut palm. Gap filling can be done during this month.

Bihar / Madhya Pradesh : Search for bud rot disease. If found infected remove all the affected tissues in the crown and apply bordeaux paste. Check for the incidence of stem bleeding. If stem bleeding disease is noticed : (1) remove the affected tissues on the stem and apply 5 per cent calixin on the wound and also apply warm coal tar, (2) root feed the affected palm with 5 percent calixin @ 100 ml solution per root at quarterly intervals, (3) apply 5 kg neem cake per palm per year along with organic manure during the post monsoon period; and (4) regulate optimum field moisture by providing drainage during rains and irrigating the palms during summer. New planting of selected quality seedlings can be continued during this month. Support the newly planted seedlings by providing suitable props. The gaps caused by the death of seedlings of previous/ current year planting should be filled up preferably with

polybag seedlings.

Chhattisgarh : Drench the basin of the transplanted seedlings with 0.05 per cent chlorpyriphos twice at 22-25 days interval against the attack of termite. Remove excess soil from the collar region of the seedlings for preventing collar rot. If the palm shows the symptom of stem bleeding, (a) remove the affected bark tissues on the stem and apply 5 per cent calixin on the wound and also apply warm coal tar, (b) root feed the affected palm with 5 percent calixin @100ml solution at quarterly intervals, (c) apply 5 kg neem cake per palm per year along with the second dose of fertilizer ;and (d) provide drainage during rainy season and irrigate during summer. Mulch coconut basin with coconut wastes and green matters.

Karnataka : Ideal time for planting of new seedlings, opening of basins, digging of pits and gap filling if any in the existing plantation. Mulch coconut basins with suitable green leaves. Continue to procure quality seed nuts from the identified mother palms and sow in the nursery. Intercultural operations have to be undertaken to keep the plantation free of weeds. Suitable intercrops like banana, vegetables, tuber crops etc. can also be raised in the coconut gardens to increase the income per unit area. Search for bud rot disease and remove infected tissues in the crown and treat with bordeaux paste. As a prophylactic measure spray 1 per cent Bordeaux mixture on the healthy palms in the vicinity of affected palms. Apply Phorate 10 G @ 100 g/ palm or drench the root zone with chlorpyriphos 20EC @ 2.5 ml/litre to control white grubs in case of its incidence. Control rhinoceros beetle by adopting IPM package consisting of extraction of beetle using a beetle hook from the affected palm, proper disposal of breeding materials of the beetle and biological suppression using microbial agents like Baculovirus of Oryctes and Metarhizium anisopliae. Incorporation of the weed plant Cleodendron infortunatum in the breeding grounds has been found effective as it disrupts larval development and finally reduces pest population. Fill the youngest three leaf axils with a mixture of 250g powdered marotti/ neem cake with equal volume of sand or deposit 10 gm naphthalene ball (4 balls) per palm and cover with sand.

Kerala/Lakshadweep : In low lying areas, plant coconut seedlings in shallow pits or on raised mounds. Apply the second dose of fertilizers in rainfed garden and one-fourth of the recommended dose in irrigated gardens. Apply cattle manure or green manure @ 25-50 kg to each adult palm if not done during previous months. Apply magnesium sulphate @ 500 gm per palm along with second dose of fertilizers and cover the basin completely. Dig out or plough the garden. Fill the youngest three leaf axils with a mixture of 250g powdered marotti/ neem cake with equal volume of sand or place naphthalene balls 10g/ palm and cover them with sand against rhinoceros beetle and red palm weevil. If the attack of the mite is noticed, spray neem oil - garlic - soap emulsion 2 percent (20 ml neem oil + 20 gm garlic emulsion + 5 gm soap in 1 litre water) or commercial botanical pesticides containing azadirachtin 0.004 per cent @ 4ml per litre of water on bunches, especially on the perianth region of buttons and affected nuts or root feed neem formulations containing azadirachtin 5 per cent @ 7.5 ml with equal volume of water.

Maharashtra/Goa/Gujarat : Apply second dose of fertilizers in basins dug around the palms. Apply green leaves at the rate of 25kg per palm. Give a third round of prophylactic spraying with bordeaux mixture to all palms. Remove ungerminated nuts and dead sprouts from the nursery. Discard seedlings exhibiting poor growth and delayed germination.

Orissa : Sow green manure crop seeds in the coconut basins. Keep the nursery free of weeds. Clean the crown from pest/ disease attack. Undertake all plant protection measurers. If the attack of the mite is noticed, spray neem oil - garlic - soap emulsion 2 percent (20 ml neem oil + 20 gm garlic emulsion + 5 gm soap in 1 litre water) or commercial botanical pesticides containing azadirachtin 0.004 per cent @ 4ml per litre of water on bunches, especially on the perianth region of buttons and affected nuts or root feed neem formulations containing azadirachtin 5 per cent @ 7.5 ml with equal volume of water.

Tamil Nadu/Pondicherry : Start intercultural operations like taking basins, ploughing etc. Apply second dose of fertilizers, 500 g urea, 800 g single super phosphate and 800 g muriate of potash per adult palm under rainfed conditions. If the attack of the mite is noticed, spray neem oil - garlic – soap emulsion 2 percent (20 ml neem oil + 20 gm garlic emulsion + 5 gm soap in 1 litre water) or commercial botanical pesticides containing azadirachtin 0.004 per cent @ 4ml per litre of water on bunches, especially on the perianth region of buttons and affected nuts or root feed neem formulations containing azadirachtin 5 per cent @ 7.5 ml with equal volume of water. Strengthen bunds of the pit of the newly planted seedling to avoid rain water accumulation in the pit. Take adequate care of the newly planted seedling by providing support/ irrigation etc.

Tripura : Clean the crown to protect the palm from any pest/disease attack. The entire crown should then be sprayed with one per cent bordeaux mixture. Second dose of fertilizers should be applied during the month. After application of fertilizer if there is no rain, irrigation should be done.

West Bengal : Hand-weed the nursery and provide partial shade to seedlings. Continue harvest of matured nuts.

Market Review June 2015

Highlights

- The prices of milling copra and coconut oil expressed a mixed trend in major markets in the country during July, 2015.
- The international price of coconut oil & copra expressed a slight declining trend during the month of July, 2015 compared to previous month.

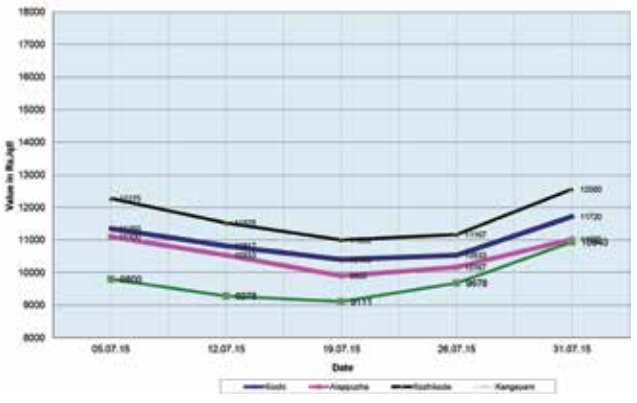
The month of July 2015 witnessed a mixed trend in prices of coconut, copra and coconut oil at all important markets in the country.

Coconut Oil

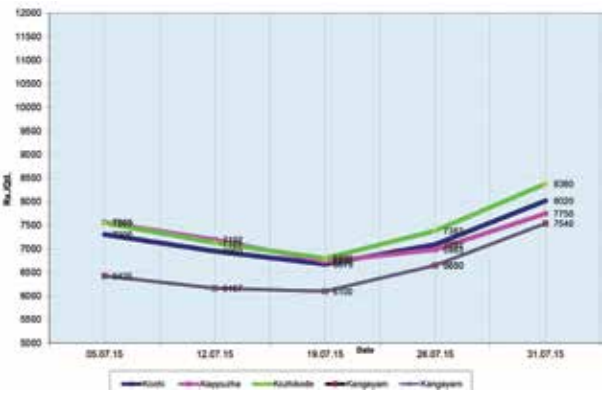
The price of coconut oil which opened at Rs.11,500/- per quintal at Kochi market, declined to Rs. 11,300/- on 2nd July and expressed a downward trend and reached Rs.10,000/- on 20th. The price thereafter expressed increased trend and closed at Rs.12,100/- with a net gain of Rs.600 per quintal. The price of coconut oil at Alappuzha market which opened at Rs.11,800 per quintal, declined to Rs. 11,000/- on 2nd July and expressed a downward trend and reached Rs.9,900/- on 13th. The price thereafter expressed increasing trend and closed at Rs.11,300/- with a net loss of Rs.500 per quintal. The price of coconut oil at Kozhikode market which opened at Rs.12,700/- per quintal, declined to Rs. 12,400/- on 2nd July, expressed a downward trend and attained Rs.11,000/- on 11th. The price thereafter expressed increasing trend and closed at Rs.13,200/- with a net gain of Rs.500/- per quintal. The monthly average price of Rs.10,927/-per quintal at Kochi market, Rs.10,508/-per quintal at Alappuzha market and Rs.11,656/- per quintal at Kozhikode market were about 12 to 13 percent lower than that of previous month and about 27 to 30 percent less than that of corresponding month last year. The monthly average price of Rs.9,715/- per quintal at Kangayam market in Tamil Nadu was 14 percent lower than that of the previous month and about 31 percent lower than that of the corresponding month last year.

Milling Copra

The price of FAQ copra which opened at Rs.7,400 per quintal at Kochi Market, declined to Rs.7,275/- on 2nd and expressed a downward trend and reached Rs. 6,675/- on 11th. The price theafter expressed increasing trend and closed at Rs.8,400/- with a net gain of Rs.1,000/- per quintal. The price of Rasi copra at Alappuzha market which opened at Rs.7,750/-per quintal declined to Rs.7,600/- on 2nd and expressed a downward trend and reached Rs. 6,700/- on 13th. The price there after expressed increased trend and closed at Rs.8,050/- with a net gain of Rs. 300 per quintal. The price of office pass copra at Kozhikode market opened at Rs.7,800/- per quintal declined to Rs.7,600/-on 2nd and expressed a downward trend and attained Rs. 6,800/- on 11th. The price there after expressed increased trend and closed at Rs.8,800/- with a net gain of Rs.1,000/- per quintal. The monthly average price of Rs.7,190/- per quintal at Kochi market, Rs.7,219/- per quintal at Alappuzha market and Rs.7,429/- per quintal at Kozhikode market were 11 and 13 percent lower than that of the previous month and about 30 and 31 percent lower than that of the corresponding month last year. The monthly average price of milling copra was Rs.6,552/- per quintal at Kangayam market in Tamil Nadu, which was 14 percent lower than that of the previous month and about 33 percent lower than that



Price behaviour of coconut oil during July 2015



Price behaviour of copra during July 2015

of the corresponding month last year. The monthly average price of milling copra at Ambajipeta market in Andhra Pradesh was Rs.6,596/- per quintal and the prices were 15 percent lower than that of the previous month and about 26 percent lower than that of the corresponding month last year.

Edible Copra

The monthly average price of Rajapur copra at Kozhikode market was Rs.13,775/- per quintal, which was 5 percent higher than that of the previous month and 14 percent lower than that of corresponding month last year.

Ball Copra

The monthly average price of ball copra at Kozhikode market was Rs.12,113/- per quintal, which was 5 percent higher than that of the previous month and about 18 percent lower than that of the corresponding month last year.

The monthly average price of ball copra at Tiptur APMC market in Karnataka was Rs.13,107/- per quintal. This was marginally lower than that of the previous month and about 12 percent lower than that of the corresponding month last year. The monthly average price of ball copra at Arsikere APMC market in Karnataka was Rs.12,139/- per quintal, which was about four percent higher than that of previous month and about 12 percent lower than that of corresponding month last year.

Dry Coconut

The monthly average price of Rs.10,252/- per thousand nuts of dry coconuts at Kozhikode market was marginally lower than that of the previous month and about 12 percent lower than that of corresponding month last year.

Coconut

The monthly average price of partially dehusked coconut at Nedumangad market was Rs.10,558/-per thousand nuts, which was about 5 percent lower than that of the previous month and about 27 percent lower than that of the corresponding month last year.

The monthly average price of partially dehusked coconut at Arisekere APMC market in Karnataka was Rs.12,785/- per thousand nuts, which was marginally lower than that of the previous month and about 4 percent higher than that of the corresponding month last year.

The monthly average price of partially dehusked coconut at Bangalore APMC market in Karnataka was Rs.16,407/- per thousand nuts, which was 4 percent lower than that of the previous month and 30 percent higher than that of the corresponding month last year. The monthly average price of Grade-1 quality partially dehusked coconut at Mangalore APMC market was Rs.17,000/- per thousand nuts, which was marginally lower than that of the previous month and about 43 percent higher than that of the corresponding month last year.

Tender coconut

The monthly average price of Tender coconut at Maddur APMC market in Karnataka was Rs.10,074/- per thousand nuts, which was about three percent lower than that of the previous month and about five percent lower than that of the corresponding month last year.

International

The International monthly average price of coconut oil at Philippines (C.I.F. Rotterdam) market was US $ 1068 per MT. This was four percent lower than that of previous month and 18 percent lower than that of corresponding month last year. The monthly average price of US$ 735 per MT of copra was marginally lower than that of the previous month and about 13 percent lower than that of the corresponding month last year.

The domestic price of coconut oil during the month of July 2015 in Philippines was US$ 1034 per MT and in Indonesia the price was US$ 1073 per MT. The international price of Palm oil was US$ 647 per MT, Palm kernel oil (RBD) US$ 875 MT and Soybean oil US$ 767 per MT during the month of July 2015. ■

Prices of coconut oil , copra and coconut at various marketing centres during July 2015

Date	Coconut Oil (₹/Qtl)				Milling Copra (₹/Qtl)					Edible Copra (₹/Qtl)	Ball Copra (₹/Qtl)				Dry Coconut	Coco-nut	Partially dehusked Coconut (₹/1000 nuts)		
	Kochi	Alappu-zha	Kozhi-kode	Kan-gayam	"Kochi (FAQ)"	Alappu-zha (Rasi Copra)	Kozhi-kode	Kan-gayam	Ambaji-peta	Kozhi-kode	Kozhi-kode	Tiptur	Ban-glore	Ar-sikere	Kozhi-kode	Nedu-man-gad	Ar-sikere	Ban-glore	Mangalore (Grade-1)
05.07.15	11350	11100	12275	9800	7306	7563	7550	6425	7500	13125	11500	12963	13500	12373	10250	10500	12750	17500	17000
12.07.15	10817	10533	11525	9278	6950	7192	7125	6167	7567	13717	12000	12950	13500	12589	10150	10500	12033	17000	17000
19.07.15	10400	9900	11000	9111	6675	6730	6800	6100	6750	13560	11800	13167	14500	12230	9830	10500	13500	16000	17000
26.07.15	10533	10167	11167	9678	7092	6983	7383	6650	5600	13950	12325	13058	15500	12076	9833	10333	13333	16000	17000
31.07.15	11720	11020	12560	10940	8020	7750	8380	7540	5720	14370	12800	13400	15500	11380	11300	11000	12200	15800	17000
Average	10964	10544	11705	9761	7209	7244	7448	6576	6627	13744	12085	13108	14500	12130	10273	10567	12763	16460	17000

Source: Kochi: Cochin Oil Merchants Association and Chamber of Commerce, Kochi - 2, Kozhikode: The Mathrubhumi daily Alapuzha: The Malayala Manorama daily, Arsikere : APMC, Arsikere
Price quoted for office pass copra at Kozhikode and Rasi copra at Alappuzha markets.