COCOINFO INTERNATIONAL

Volume 23 No. 1, 2016 / ISSN 0854-5006

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VOLUME 23, No. 1, 2016 / ISSN 0854-5006

COCOINFO INTERNATIONAL

Cocoinfo International is a popular journal on the coconut industry published twice a year by the Asian and Pacific Coconut Community (APCC)
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Home page: http://www.apccsec.org
Queries and information regarding subscription and advertisement insertion rates should be directed to the above address.
Foreign subscription rates including airmail postage for one year (two issues) is US$35.00 (APCC Member) US$ 40.00 (Non-APCC Member Countries)

From the Editor-in-Chief

ACCESS TO KNOWLEDGE AND TECHNOLOGIES ON COCONUT PRODUCTS EMPOWERS STAKEHOLDERS

The importance of coconut in the global community has been further promoted by the recent release of the 'Coconut Handbook' by Tetra Pak South East Asia's Coconut Knowledge Centre in Singapore. The relevant chapter in the book on 'Production of Coconut Foods' highlights how coconut is positioned so well, unlike any other food product, to be able to move into many different categories of foods and beverages consumed daily by people of all walks of life. Useful knowledge of the health benefits of coconut products are highlighted in the reports as a result of the decades of researches and findings.

The Coconut Research Institute in Sri Lanka has also recently progressed with a number of publications on the important aspects of coconut development, one of which is 'Organic Coconut Cultivation', a farming method that is most sought after around the world. The Institute responded to APCC request in developing International Certificate Training Course relating to the management of coconut plantation and related technologies. Upon commencement it is intended to provide a rare opportunity for specialised training in all stages from nursery to field operations and eventual downstream processing of coconut products. The training packages come highly recommended for all actors in the coconut sector.

A significant increase in processing of value added products of coconut is evident throughout the region prompted by the escalating demands by importing countries with their fast emerging and growing markets. It is encouraging to note the expansion of the industry where processing at point of origin of raw materials is beginning to happen. Under these circumstances it is important that up-to-date knowledge and appropriate technologies are accessible by the micro to small and medium enterprises so that adequate capacity is in place to deliver products to the expectation of the consumer markets whether in the USA, Europe, China, Japan, the Middle East or in Australasia.

Indonesian province of Central Java boasts of the achievements of its Banyumas Regency that lead the region in production of coconut sugar [*gula kelapa*]. It was reported during an APCC Secretariat visit with the Regent that at least 3,000 MT is exported to the USA each month from the estimated total of 120,000 MT produced each year. It was noted during the visit that there was a very high percentage of the rural population fully engaged in agricultural activities with mostly harvest and processing of *gula kelapa* that reaches the shelves of major supermarket chains in the Indonesian capital city of Jakarta.

Health benefits of coconut products would be the major driving force impacting the market place going into the future. Virgin Coconut Oil use as a food supplement with its anti-viral, anti-bacterial and anti-protozoal properties is now in very high demand with increasing requests for organic certified lines. Coconut sap products and coconut water would no doubt shortly be experiencing low supply, if not already, again as a result of the promotion of many benefits to human health. Scientific research and clinical studies are going to be pursued in the coming years to eventually declare conclusive evidence thereby setting aside negative claims and reassure consumers of the truth about coconuts.

The Government of Indonesia is host to the 52nd APCC Session/Ministerial Meeting to be held in Jakarta on 23 – 26 May 2016 together with the APCC Secretariat extend a hearty welcome to the State Ministers and Delegates from the 18 member countries, the international partner institutions observing and all distinguished participants. The meetings would no doubt result in many positive outcomes that are set to impact well on the coconut sector globally.

APCC wishes all participants a safe stay in Jakarta and an enjoyable visit to *wonderful Indonesia*.

URON N. SALUM
Executive Director and Editor in Chief

US investor eyes Samoa's coconut industry

Agriculture Minister Le Mamea Tuiletufuga Ropati Mualia is optimistic that negotiations with a major wholesale and retail outlet in organic coconut cream in the United States will become a reality before Government is dissolved as a lead up to the General Elections next March. The investor, Dr Bronner's USA has over 15,000 employees on its payroll and they are interested in setting up shop in Samoa targeting the lucrative organic markets in Europe and across the United States. "We have been negotiating for a while and like any multi-million tala investment there are certain grey areas which we must reach a compromise for Dr. Bronner's proposal to become a reality," said Le Mamea. After initial contact, Chief Executive for Agriculture and Fisheries Fonoiava Se'aliitu Sesega says that the company has committed in principle pending the outcome of a national coconut survey. "Government has receptive to Dr. Bronner's request and a high level Committee which I am chairman and includes my counterparts from Finance, Commerce, Labour and Industry has been established to implement the survey," said Fonoiava. "Dr. Bronner wants to set up two coconut cream factories, one each for Upolu and Savai'i. Their initial employment capacity is for 350 workers but that number will increase depending on their human resources needs. At full capacity, Dr. Bronner estimates that the two factories can process up to 110 million nuts a year. And they are offering a buying price from farmers at 30 sene per nut compared to the current price of 10 sene per nut. This is perhaps the biggest ever investment proposal to come our way and we have been given the green light from the Prime Minister and Cabinet to proceed with full speed for the proposed partnership to become a reality." (*www.iniinisamoa.com*)

Solomon Island Threat from coconut syndrome monitored

Solomon Islands is still monitoring the threat of Bogia Coconut Syndrome (BCS) disease at the international border in Shortland from entering the country. The disease found in Madang province, Papua New Guinea in 2013, is caused by a phytoplasma that not only affects coconuts but also banana and betel nuts. Minister of Agriculture and Livestock, Duddley Kopu confirmed this in reply to a query by member of North West Choiseul, Connelly Sandakabatu in Parliament. Mr. Kopu said, the disease has not entered the country but a team is keeping a close eye on it.

He said the surveillance regime is part of the normal pest and disease monitoring work carried out by the Biosecurity and Research Departments of the Ministry to watch out for and keep the disease from entering the country. Mr Kopu thanked the Australian Department of Agriculture for the assistance provided under the Biosecurity Strengthening programme towards pest and disease surveillance especially at the border. In the meantime, Kopu said the Ministry is addressing the outbreak of rhinoceros or beetles that affected coconuts on Guadalcanal few years back. (*www.solomonstarnews.com*)

Thai Delegation Visits CDB Office

A team of 5 delegates from CP (Charoen Pokphand) group, Thailand, headed by Khunsri Thongyoi, Senior Vice-President of CP Crop Integration Business, CP Group, visited Coconut Development Board during their five-day tour in South India. Charoen Pokphand, the largest private company in Thailand which has been active in India for the past 20 years, is yet to set foot in the agriculture sector.

The purpose of visit is to explore the possibilities of establishing individual coconut producing units or starting joint ventures with the coconut producer companies in South India, said CDB officials. They held discussions with Chairman and other senior officials of Coconut Development Board. T K Jose, Chairman of CDB, briefed about the coconut cultivation and industry in India and scope for starting coconut-based industries by the CP group in association with Indian partnership. The team also met the Chairmen and CEO's of Coconut Producer Companies viz, Thirukochi, Tirur, Kuttiady and Palakkad, registered under Board and noted ways and means of their activities. The visitors also evaluated their opportunities with business promoting organisations such as FICCI, CII, Kerala Chamber of Commerce and Inkel.
(*www.newindianexpress.com*)

Tetrapak launches the Coconut Handbook

The Coconut Knowledge Centre of Tetrapak has launched the Coconut Handbook in April 2016 which offers advice and practical information from coconut plantation management and production through processing to nutritional benefits and distribution of coconut products. The Coconut Knowledge Centre is a Tetrapak operation based in Singapore. The Handbook, with rich information on product development, processing and packaging technology and the quality control methodologies is meant to guide enterprising entrepreneurs interested in coconut processing. It speaks from all angles of the coconut supply chain, giving information about market opportunities, specific processing requirements and the challenges for coconut products. Tetrapak have consolidated their extensive knowledge and experiences on coconut processing in the Coconut handbook. Considering the delicate composition of coconut which presents many challenges for manufacturers, the Handbook

would serve as a guide on the appropriate measures required at every step of the production process to ensure product quality. Mr. Samit Chowdhury, Director of the SAEAO Marketing Services and Coconut Knowledge Centre of Tetrapak South East Asia Pte Ltd indicated that they are in constant research and development through their Product Development Centre in Singapore to address the concerns and issues faced by manufacturers in coconut processing

Largest coconut processing factory inaugurated

The Ben Tre Import Export Joint Stock Company inaugurated and put into operation a factory manufacturing canned coconut milk in the Mekong Delta province of Ben Tre. The factory, the largest of its kind in Viet Nam, covers a total area of 7.5 hectares in the Phong Nam small-scale industrial complexes in Giong Trom District. It cost over $20 million. The mill has an annual capacity of 37 million litres, consuming about 200 million coconuts in the province a year. Up to 90 percents of its products are expected to be exported to North America, Europe, and several countries in North Africa and Asia. Ben Tre is the country's largest coconut cultivation locality. having 63,000 hectares generating 500 million coconuts each year. (*bizhub.vn*)

Pacific's Smallest Nations Showcase Boutique Products on Food and Beverage Trade Mission

Six exporters from the smallest island states of the Pacific were in Auckland on the Pacific Islands Trade & Invest Food and Beverage Exploratory Trade mission from 9-13 November to learn more about the landscape of the New Zealand market. The six exporters from the Cook Islands, Kiribati, Palau, Niue, Nauru, Tuvalu and the Republic of Marshall Islands (RMI) brought product samples ranging from wines and liquors from local fruit and vanilla beans from the Cook Islands, coconut sap sugar, syrup and virgin coconut oil from Kiribati, organic vanilla from Niue, pandanus juice from the Marshall Islands, giant clam shells and mangrove crabs from Palau and coconut oil, banana and breadfruit chips from Tuvalu.

Pacific Islands Trade & Invest Trade Development Manager Teremoana Mato said there are many challenges for small island states with rising sea levels from climate change, shipping costs and distances to market but they continue to seek ways to be resilient. "International buyers take a strong interest in the unique stories behind the origins of our small island states products. Some of the delegates represent village set-ups, cooperatives and women's groups. These groups take a lot of pride in the unique production of their products. The advantage of being small is that the enterprises know every step of the production cycle and closely monitor the quality of their product. Involvement in exports gives our people the opportunity to take pride in the products as they can feel engaged with the world, with whom they may never meet but have a sense of being a part of the development of a Pacific product makes a difference in their economic activity at the village level" says Mr. Mato.

The mission is the first Pacific Islands Trade & Invest Small Island States trade delegation to visit New Zealand for several years. The tailor made programme is industry specific focused on the food and beverage industries. The delegates attended a workshop on NZ import regulations and processes to understand some of the technical barriers to trade, sanitary and phytosanitary requirements, visited government biosecurity and customs departments, private sector importers and buyers; chefs and hospitality industry representatives to gain key insights into the industry trends and opportunities from importers, distributors and retailers. The project is a joint venture by the Pacific Islands Trade & Invest supported by the Pacific Integration Technical Assistance Programme under the European Union. *(Press Release of pacific Islands Trade and Invest)*

APCC Office Premise Moves to BAPPEBTI Building, Jakarta.

Since January 2016 APCC Secretariat has moved from 3rd Floor, Lina Building at Jl. H.R. Rasuna Said Kav. B7, South Jakarta to a new office premise at the 8th Floor of BAPPEBTI (Supervising Agency for Commodity Future Trading) Building at Jl. Kramat Raya 172, Central Jakarta 10430. The official inauguration of the new APCC office premise was conducted by Mr. Bachrul Chairi, Director General of International Trade Cooperation, Ministry of Trade on 4 January 2016. In his inaugural speech, Mr. Bachrul Chairi insisted the importance of coconut farmers to go on downstream processing and value addition in order to make coconut sector more remunerative. The inauguration ceremony was attended by officials from Ministry Trade, Ministry of Agriculture, as well as private sectors dealing with coconuts. It is expected that in this new office premise APCC will play more dynamic roles in serving coconut industry for the benefits of all coconut stake holders including farmers, processors, traders, exporters, and consumers.

CDB Institute to Launch Flavored Coconut Juice

India's CDB Institute of Technology said flavored coconut juice will soon be made available within the next six months. The product, which was developed by the Institute has been well received during test marketing, a senior official in the

Coconut Development Board said. The coconut juice is made out of liquid pulp extracted from the kernel. Fresh green nuts with 10 months maturity are suitable for processing. The fresh nut water is mixed with the extracted juice so as to enrich the nutrient contents.

The institute has already developed a technology for juice production with a shelf life of two weeks and they are now in the process of extending the time frame to six months. After introducing the product in fairs and expos, the Board now plans to conduct B2B meets for the promotion of the product as a natural, nutritious and toxin free health drink. *(UCAP Bulletin)*

Roxas Sigma Agriventures Starts Building Coco Processing Plant in South Cotabato

Roxas Sigma Agriventures, Inc. (RSAI), a joint venture between Roxas & Co. (RCI) and Sigma Xynergies Corporation, has begun construction of its planned Integrated Coconut Processing Facility in Tupi, South Cotabato. The plant, expected to be completed by the end of 2016, has a capacity to process 200 metric tons per day of coconuts to produce coconut water concentrate, coconut milk, coconut cream, and virgin coconut oil, mostly for export.

The plant is expected to employ at least 500 workers while nearly 122,000 coconut farmers in Region X11 will be benefited once the plant becomes fully operational by providing them a new market for their top quality coconuts. RSAI and RCI Chairman Pedro E. Roxas said the integrated coconut processing enterprise in the town of Tupi is a definitive step towards ensuring inclusive growth and development in this part of the Philippines. *(UCAP Bulletin)*

"Sri Lanka Gold" Coconut Water Beverage to See Launch in U.S. Shores

Two D.C. based international development economists, partners in life and business, are launching bottled king coconut water and are aiming to have it on natural food store shelves by February, a report from FoodNavigator says. According to the couple, Sheri and Nihal Pitigala, the recent boom of coconut water in mainstream retailers finally pushed them to realize the idea over a decade ago of bottling the water out of king coconut or *thambili* in Sinhalese. Dubbed Sri Lanka Gold, the ready-to-drink (RTD) coconut water beverage is made purely out of the golden color king coconut water.

Back 10 years ago, Sheli said, coconut water was usually found in a can with added sugar, and buyers would have to go to a non-Western specialty store to find a variety of options on one shelf. Today, they can be found in multiple forms of packaging in many grocery stores, and even convenience stores, gas stations, vending machines and drug stores. It is safe to assume that Sri Lanka Gold will be the first king coconut RTD beverage.

The Pitigalas worked together with the Coconut Research Institute of Sri Lanka to research and verify the king coconut's health benefits. King coconuts, like their young green cousins, have plenty of electrolytes, but its golden color means it has more vitamin C than its green counterparts. When it comes to the taste profile, it has a more "balanced, delicate flavor with a crisp and clean feel when you drink it," Sheri said, compared to the young green kind. *(UCAP Bulletin)*

Million Dollar Coconut INDUSTRY

A new Fijian company has plans to create a multi-million dollar export industry on what it says is the purest virgin coconut oil in the world. The Coconut Company (Fiji) Ltd is already producing products by adding value to the estimated 75 million coconuts that fall to the ground in Fiji every year and are never used.

It is developing a range of coconut based products that will be launched in the next few months. The Coconut Company is a big change in career direction for Sharon Smith-Johns, the former permanent secretary for the Ministry of Information in the Bainimarama Government, who resigned to resume her business career after the September election. "Since the decline of the copra industry, tens of millions of coconuts continue to grow on plantations throughout Fiji but are never utilised," company co-founder Ms. Smith-Johns said in a statement.

She said they intended to empower grassroots communities and generate revenue for them and for Fiji by turning this wasted resource into a major export earner. "When I left government, I took a holiday in Savusavu and Taveuni, the heart of what used to be the copra industry before the collapse of world prices. "I was talking to farmers who were bemoaning the loss of the industry when I started to think about ways in which we could turn all these unused nuts into items of value again — to reinvent the coconut industry in Fiji."

She said other companies had added value on a smaller scale but the idea behind the Coconut Company was much more ambitious — to develop a range of high quality products to take the Fijian-Made coconut brand to the world and earn new strands of export income in which ordinary Fijians also had a stake. Before heading the Government's information effort, Ms Smith-

Johns spent many years in marketing and the skills she gained in major Australian companies such as Fairfax Media were being put to good use in the Coconut Company. "It isn't enough to source the nuts and turn them into a range of top quality products. We need to find markets for those products around the world."

Furthermore, she said plans to export virgin coconut oil to China were well advanced. And as well as targeting Fiji's traditional markets of Australia and New Zealand, she added the company has its eye to export to the rest of the Asia Pacific, Europe and the Middle East. "Consumers everywhere are always looking for quality and that's what we intend to give them — the best of everything that can be derived from the humble Fijian coconut."

As there are no added chemicals, she said Fiji's virgin coconut oil was pure, and it was rapidly becoming a household item, consumers were cooking with it, drinking it and using it for its many health benefits. Ms. Smith-Johns said a central platform of company's business plan was to put money back into local rural and maritime economies. "Even on conservative projections, we estimate that more than $1.5million will flow into rural and maritime communities by the end of 2017 from the sale of our oil and coconut products."And, of course, the more we export the greater the amount of revenue we will bring back into the country. "I'm convinced that we are going to see a great revival in the local coconut industry, with flow-on benefits to the rest of the economy and every Fijian," she said. *(http://www.fijitimes.com)*

Fiji Coconut Products Attract Women, Fashion Lovers

Coconut products were part of the Northern Agriculture Show in Labasa attracting women and fashion lovers. Belts, cooking utensils, decorations and other products made from coconut have been a major attraction resulting in people crowding the Taveuni Research and Development Centre stall to have a look at the products.

Principal agricultural officer Northern John Cox stated that the products were not for sale but to demonstrate ways in which people could utilise coconuts even after being used. "The soap, jewellery and handicrafts are all ways in which you can utilise coconuts," he said. "Soap is from the oil, the jewellery and other handicrafts are from the coconut shell which right now is high on demand but the supply is low. "These displays are a perfect way of utilising coconuts and earn a living from it."

Mr. Cox added that there had been trainings conducted by the Ministry of Agriculture in the Northern Division to educate people on how to make such products. "We just completed a month training last week at the Taveuni Agriculture Research and Development Centre on coconuts for people from selected areas on Vanua Levu," he said. "They were given machineries to help them make oil, soap of different kinds and fragrances, shells, and so on. "This is the fourth training on coconut that we have conducted in the North so far." Mr. Cox assured that there had been a lot of interest from the people in this venture.
(http://www.fijitimes.com)

Kiribati Turning Coconuts into Power

Coconut palms wave lazily yet happily at passers-by in the Central Pacific afternoon sun, providing a first insight into its own, century old, role in supporting the island lifestyle. Coconut trees have always been a part of life here on island. Not only do they provide nourishment and building material but they also play an important role in cultural and social events. Now, with the assistance of the United Nations Development Programme (UNDP) and the Secretariat of the Pacific Regional Environment Programme (SPREP), coconuts are taking on a new role in the sustaining and progression of livelihoods in Kiribati. Kiribati, a small atoll nation spread across 33 coral atolls in the Pacific with a population of 102,351, has challenges in their fuel and energy supply. In order to solve this, UNDP and SPREP is supporting Kiribati in a new and innovative project which will utilise coconut oil as fuel.

Within Kiribati, the copra industry contributes roughly a quarter of the country's GDP. With rising diesel prices, using natural, indigenous resource to lower CO2 emissions and also reduce the cost of power makes a lot of sense. The end goal of this project is to assist the Kiribati Government to replace fuel for generators that is today 100% fossil, with clean, locally produced coconut oil, starting with Abemama island.

A feasibility study on coconut as biofuel was completed in 2012. The results from the study found that using coconut oil (CNO) benefitted the country by; (1) saving costs for government and transport agencies and (2) generating a local market and (3) is much more environmentally friendly than other forms of energy production. Based on these positive results, further funding was provided by the Government of Denmark for the creation of the full project which will enable Kiribati to utilise coconut oil as a fuel substitute.

The biofuel project will construct a Biofuel Mill on Abemama Island that will produce CNO. There is currently no CNO production on the island, although the island does produce copra. The CNO produced is suggested used at three different

sites around the island; Kauma High School, Chevalier College and the Island Council.

At these sites the CNO will be blended with Diesel Oil Fuel (DFO), with the end goal is to have biofuel with 90% CNO/ 10%DFO. It has been estimated that at the target level of 90%CNO/10%DFO, only 1,980 litres of DFO would be used per year. At this production level, the volume of copra consumed (30-35 tons), will represent less than 4% of Abemama production.

South Astral of Australia has been contracted to complete the work on island. Currently the company is consolidating the necessary supplies and materials with the goal of shipping this out through Sydney during November and December. The first task will be to commence the construction of the building at the Island Council site. The building, plumbing and electrical work will be given to a local builder, with the aim of having this job completed by November.

Immediately following this the engineer will travel to Abemama to install the expellers and generators. The goal will be to have the construction and installation aspects of the project completed by the end of the year.
The local community is excited about the project, and so is Miriam Iakobwa, the project manager: "We look forward to reducing our dependence on imported fossil fuels though production of biofuel from locally available resources. This will make a huge difference to not only the local communities but also the country as a whole." (www.*undp.org)*

Eggs, butter, nuts, coconut oil, meat are okay; sugar is the enemy – USDA

What used to be known as high-cholesterol food – like eggs, butter, coconut oil and meat – is now actually safe for intake while the real enemy is sugar, according to the US Department of Agriculture (USDA).

In its Scientific Report of the 2015 Dietary Guidelines, the advisory committee of the USDA, food with "nutrients of concern" such as eggs, butter, full-fat dietary products, nuts, coconut oil and coconut meat, has been classified as safe for intake, a complete twist from reminders to turn away from high-cholesterol food since the 1970s.

Citing the lack of relationship between consumption of dietary cholesterol and serum (blood) cholesterol, the 300-milligram per day limit on cholesterol intake will be removed from the previous guidelines initially published in 2010. The public will no longer be alerted about the risks of high-cholesterol food intake in combating cardiovascular diseases and stroke. This also leads to the reintroduction of good cholesterol in food-based recommendations.

Dietary cholesterol is now "not considered a nutrient of concern for overconsumption," the report stated. However, eating less saturated fat is still recommended.

Sugar is the new enemy

From the joint efforts of the US Department of Health and Human Services, Nutrition Evidence Library, US health data monitoring systems, National Health and Nutrition Examination Survey, and through the USDA's food pattern modeling process, results reveal that the public should focus on sugar as the main substance of dietary concern instead.

Added sugar is said to have zero nutritional value. Studies have shown that the body does not require carbohydrate for energy from added sugar. Carbohydrates that lack fiber (sugar) have the highest impact on insulin surges, which is also a fat-storing hormone. Thus, the latest report recommends that sugars be consumed in low amounts.

The public is also advised to replace sugary drinks with water instead of low-calorie sweeteners as there is still no substantial evidence to prove that such drinks could help in weight loss.

Added sugars were found to add empty calories to one's diet as studies show that Americans get about 13 percent of their calories from added sugar, or 268 calories a day. Adolescents and young adults take in more.

According to a report from the International Business Times, American cardiologist Dr. Steven Nissen said "20 percent of cholesterol levels in your blood come from your diet, which means the rest is produced by your liver and is actually needed by the body." *(www.mb.com.ph)*

Renuka crowned 'Best Coconut Brand' at Presidential Export Awards

Renuka was recently adjudged the 'Best Coconut Brand' and Renuka Agri Foods Plc was awarded the 'Best Brand Exporter' and 'Best Exporter – Coconut Sector' at the Presidential Export Awards Ceremony held under the patronage of President Maithripala Sirisena in Colombo. Renuka was the only coconut brand to receive this honour which is the highest form of recognition given to an exporter for its contribution towards the export efforts of the country.

The Presidential Export Awards (PEA) recognize the contributions made by the export community towards national development and symbolizes the national recognition of the individuals or enterprises that excelled in export business,

particularly in non-traditional products and services. The selection criteria for winners are based on contributions to overall export earnings, product development, market development and social development made to the country.

Renuka is the only brand of Coconut Milk Powder endorsed by the Sri Lanka Standards Institute. Renuka manufacturing plants hold Sri Lanka Standards Institute (SLSI) ISO 22000-GMP, British Retail Consortium (BRC) and London Bethdin Kosher certification, thus ensuring high-quality, safe and hygienically processed products. Renuka is proudly 100 percent Sri Lankan in origin and roots and has major plans in terms of its geographic expansion and the establishment of the Renuka as one of the most trusted Sri Lankan brands globally. The Renuka brand is currently distributed and marketed in over 25 countries including Germany, the UK, Netherlands, Belize, Jamaica, Australia, India, the Middle East and Africa through a strong network of distributors.

Renuka's very first international market entry was into Europe three decades ago with a 100 percent coconut, value-added, non-traditional convenient coconut product called creamed coconut. Since then, the brand had grown in Europe to command its current position as one of the best tasting coconut products. This position led to the company commencing the export of Coconut Milk Powder in 2005 to the Middle East. The brand has strong equity in the ethnic food segment in most of the geographies it is distributed in and its strength has always been the consistent delivery of real coconut ingredients and beverages. Renuka's product assortment conforms to the highest local and international standards and adheres to strict hygienic conditions to provide consistent and guaranteed quality products to all consumers. Renuka Coconut Milk Powder, Coconut Milk (in cans and tetra packs) and Coconut Milk Drinks are some of the products made available to the local consumers. A company spokesman stated that the brand has shown remarkable growth in its market share over the years since its launch in Sri Lanka in 2006. *(www.dailymirror.lk)*

VCF makes history selling dry coconuts

A total of 82,000 freshly harvested dry coconuts from Map-best Cooperative in Malekula in 648 copra bags are on sale at Vanuatu Cooperative Federation at Vt1,200 a bag with 34 nuts inside. Due to lack of space at VCF, the bags of nuts are held at a private property at Blandinieres Estate and will be delivered on order for any business client without vehicle. A further 5,000 loose coconuts and 20 healthy pigs from the same cooperative are also on sale at Marobe Market. Members of the public are encouraged to buy their coconuts while the current supplies last. Rest assured more coconuts are coming.

A special advantage of the nuts is that as long as they remain unhusked, they can last a long time and are protected from the elements. Map-best Cooperative Plantation is located along the 20 kilometre road from Lakatoro to South East Malekula on 484 hectares of agricultural land owned by the cooperative.

Director of Cooperatives Ridley Joseph successfully negotiated the deal with the cooperative taking into account the devastating impact of Cyclone Pam on the islands of Efate and Tanna in particular, followed by the current El-Nino effect. He said when 34 nuts (equivalent to one bag of coconuts) are processed into copra, it sells at Vt35 per kilo, compared to a bag filled with 34 unhusked dry nuts which sells at Vt1,200. It definitely makes sense for Map-best Cooperative to sell 82,000 nuts to VCF. The Director said, "I am preparing to pay Map-best Cooperative an amount in cash totalling Vt2,870,000 for its dry coconuts. What it means is that it proves lucrative to sell us dry coconuts without having to go through the labourious processes of turning them into copra and getting far less for the nuts". The arrangement by the VCF is that Map-best buys the nuts and VCF sells them to complement food supplies in Port Vila and Tanna to start with. *(www.dailypost.vu)*

Farm exports from Vietnam to China surge

Ben Tre Province exported more than 16.2 million coconuts last year with 36,000 of them to South Korea and the remainder to China, statistics of the Ben Tre Coconut Association showed. The biggest coconut producing province in the Mekong Delta was able to earn only around US$4.5 million from exporting coconuts in 2015, including US$20,280 from Korea. The association said a coconut was sold to China at 27 U.S. cents, equivalent to VND6,000, while the price paid by Korean importers was 56 U.S. cents.

Ben Tre also shipped value-added coconut products, including dried sliced coconut flesh, powdered and canned coconut milk, and coconut oil and jelly to the United States, the European Union (EU), Singapore and other markets. Last year, the province obtained more than US$138 million from export of the fruit. Coconut prices in the Mekong Delta provinces range from VND30,000 to VND80,000 a dozen. *(www.vietnambreakingnews.com)*

Coconut Oil in a List of 10 High Fat Foods that are Healthy

An article that appeared in Business Insider by Kris

Gunnars, Authority Nutrition, lists "10 high-fat foods that are actually good for you". *Coconut and coconut oil* are listed as No. 9. The report describes coconuts as "very high in medium-chain fatty acids, which are metabolized differently from other fats. They can reduce appetite, increase fat burning, and provide numerous health benefits". It has, among others, beneficial health effects on persons suffering from Alzheimer's disease.

Other high-fat foods listed were: 1) *Avocados*- which are an excellent source of potassium and fiber, and have been shown to have major benefits for cardiovascular health, 2) *Cheese*, a great source of vitamins, minerals, quality proteins, and healthy fats, 3) *Dark Chocolate,* very effective at improving cardiovascular health, 4) *Whole Eggs*, among the most nutrient-dense foods on the planet, are incredibly nutritious and healthy, 5) *Fatty fish*, like salmon is loaded with important nutrients, especially omega-3 fatty acids. Eating fatty fish is linked to improved health, and reduced risk of all sorts of diseases, 6) *Nuts*, loaded with healthy fats, protein, vitamin E, and magnesium, and are among the best source of plant-based protein. 7) *Butter from Grass-Fed Cows*, studies show that high-fat dairy products are linked to reduced risk of obesity, and reduced risk of cardiovascular disease in countries where cows are grass-fed, 8) *Extra Virgin Olive Oil*, with many powerful health benefits, and is incredibly effective at improving cardiovascular health, and 10) *Full-Fat Yogurt*, lead to major improvements in digestive health, and may even help fight heart disease and obesity according to studies. *(UCAP Bulletin)*

Report fills gap on trade statistics in the Pacific

Primary industries are the backbone of many Pacific Island countries but there is a great need for more up-to-date information on trade in the region to better understand and grow national economies. These were the sentiments expressed by Fiji's Trade Commissioner to Papua New Guinea, Navitalai Tuivuniwai, at the launch of a comprehensive Pacific Islands Trade Report 2010-2014 alongside the European Union Ambassador for the Pacific, H.E. Andrew Jacobs, and Pacific Community Director-General, Dr. Colin Tukuitonga, in Suva, Fiji. "To date there is very little readily available information on trade statistics in the Pacific region and this report released by the Pacific Community and the European Union goes a long way to help fill that gap," Tuivuniwai said. "This is a valuable tool as Pacific Island governments, donor agencies and businesses now have access to standardized information on the region's main primary sector export products, the biggest markets for these products and relative trading status of each country," he said.

The report was produced by the EU-funded Increasing Agricultural Commodity Trade (IACT) project, which is implemented by the Pacific Community (SPC). Drawing on data released in 2015 from the International Trade Centre, the report provides a snapshot of trade in primary sector goods between Pacific Island countries and the rest of the world, with Australia and New Zealand, and between the Pacific Island nations themselves. It shows that Papua New Guinea, Solomon Islands and Fiji share close to 90 percent of total revenue earned by the Pacific Islands region for the export of primary products worldwide.

In 2014, the total value of primary sector exports from the Pacific amounted to USD 3.97 billion of which Papua New Guinea earned a significant USD 2.2 billion, followed by Solomon Islands (USD 659.8 million) and Fiji (USD 637.2 million). "I'm convinced that this report will be a useful tool for the Pacific business community which will have access to an easy-to-read overview of regional trade flows and growth trends," Ambassador Jacobs said. "Obtaining reliable statistical data in the Pacific is a major challenge, and the European Union has been supporting several regional partners, such as the South Pacific Tourism Organisation, Pacific Community and Oceania Customs Organisation to help them to collect and analyse statistical data. Accurate trade statistics are essential both for making informed public policy choices and for successful business investment decisions. For development partners as well, trade statistics are important data sources for monitoring and evaluating trade-related assistance projects," Ambassador Jacobs added.

The report shows that within the Pacific region's primary sector, the products showing good potential are fish, wood, cocoa, virgin coconut oil and root crops.
"Agriculture, forestry and fisheries provide an important revenue source for many of our region's farmers, fishers and enterprises. That's why SPC continues to utilise its technical and scientific expertise to strengthen sustainable management of natural resources, enabling Pacific people to benefit from sustainable economic development," Dr. Tukuitonga said. Fiji was the only Pacific Island nation that exported in significant quantities to other Pacific Island countries, accounting for 96 percent of all intra-regional exports.

The 15 Pacific Island countries highlighted in the Pacific Islands Trade 2010-2014 report are Cook Islands, Federated States of Micronesia, Fiji, Kiribati, Marshall Islands, Nauru, Niue, Palau, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Tuvalu and Vanuatu. With support from the European Union over the past four years, the IACT project has been actively assisting 42 enterprises to grow their businesses and create job opportunities across the region. *(http://www.saipantribune.com)*

BANYUMAS REGENCY- THE BIGGEST COCONUT SUGAR PRODUCER IN INDONESIA

Muhartoyo and Deepthi Nair

Coconut Sugar has gained popularity among health conscious consumers especially in the US, EU, Japan and Australia since the last few years as it is considered healthier than table sugar. According to the Philippine Department of Agriculture Coconut sugar has glycemic index (GI) of 35 which is lower than that of table sugar which has GI of around 60. In addition to lower GI, coconut sugar is also more superior in its contents of essential vitamins, macro and micro nutrient. Most notable of these are the minerals Iron, Zinc, Calcium and Potassium that may also provide some health benefits.

Regent Achmad Husein (in Black Hat) and his Staff Receiving APCC Team

Banyumas Regency is one of regencies in West Java, Indonesia. This is one of coconut growing regencies in Java Island and the most popular coconut product from this Regency is coconut sugar. During the industrial visit in this Regency, APCC (Asian and Pacific Coconut Community) team consisting of Mr. Uron Salum (Executive Director), Mrs. Deepthi Nair (Assistant Director), Mr. Alit Pirmansyah (Market Development Officer), and Muhartoyo (Documentalist) had a courtesy visit to the Regent Achmad Husein in his Office. According to Mr. Achmad Husein, Banyumas Regency alone currently produces 90,000 MT of coconut sugar per annum. This makes Banyumas Regency the biggest coconut sugar producer in Indonesia.

Coconut sugar processing in Banyumas Regency has been practiced from generation to generation. According to Srigito, Head of Forestry and Agricultural Industry Section of the Regency Office for Industry, Trade and Cooperatives, Banyumas Regency has 18,400 Ha coconut areas, of which 4,800 Ha are used for coconut sap tapping. The number of tapped coconut palms is 600,000 trees producing 250MT coconut sugar daily. This production capacity can be doubled as the number of untapped coconut palms is more than 1 million.

The coconut sugar industry is really the prime-mover of the regency economy. About 150,000 people in this regency are dependent on the coconut sugar business. Currently a total of 31,000 small and medium coconut sugar businesses are operating in Banyumas spreading across 23 sub-districts with 230 villages. In such villages practically there is no unemployment. Coconut sugar processing has provided good employment opportunities and livelihood.

As the demand for organic food product is increasing, a number of coconut areas in this regency are organic certified in compliance with USDA standard. It means the coconut sugar produced from the certified organic area can enter organic food market in the USA. Obtaining organic certification is not easy for marginal coconut farmers as it is very costly for them. Therefore some groups of coconut farmers have made some agreement with their buyers to have their coconut farms certified organic.

In this type of arrangement the buyers shoulder the cost of

certification and the coconut farmers will sell their organic coconut sugar exclusively to the said buyers. So both buyers and farmers benefit from this arrangement. However, not all farmers can have this kind of arrangement. In this regard, the Banyumas Regent explores the possibility of assisting these groups of coconut farmers to have their coconut farms certified organic.

Coconut sugar produced from this regency is distributed in both domestic and export markets. Domestic market is mainly dominated by soy sauce factories which need a big amount of coconut sugar. For export market, every month not less than 60 MT of coconut sugar are exported to some importing countries such as USA, Turk, the Netherland, South Korea, Europe and Australia.

The Domestic consumption of coconut sugar can still be further increased. Some coconut producers have made some necessary efforts to enter retail markets, hotels and restaurants such as improving packaging and quality control. Consumers need to be continuously informed on the health benefits of using coconut sugar in their diet.

As coconut sugar processing in Banyumas is mostly done in a kitchen scale, hygienic kitchen environment is very important to maintain the quality of products. The local government through its relevant office assists coconut sugar processors to develop a clean and hygienic kitchen for coconut sugar processing.

An example of kitchen scale coconut sugar processing is run by Darsim Mad Iksan and his wife Dwi Astuti. This processing unit was a typical home/small scale unit which undertakes production, processing and marketing of coconut sugar from Neera under the brand name ***Klapakoe***. The tapping is currently undertaken in 60 traditional tall palms and 12 dwarf palms. The production of Neera is to the tune of 120-140 litres per day with high production up to 180 litres per day obtained during rainy season.

APCC Executive Director, Mr. Uron Salum Talking with Mr. Darsim, the Owner of Klapakoe Coconut Sugar Processor

The neera collected is then concentrated in large aluminium vessels (35 Liter capacity) with continuous stirring in the traditional method, using firewood and saw dust as fuel. The thickened syrup is then taken off the fire and stirred continuously to ensure smooth granulation. The granules that clog are ground using a polished coconut shell,

Granulated/ Crystallized Coconut Sugar

Sieving to Remove Impurities from Coconut Sugar

sieved for uniformity in granule size, oven dried to a moisture content of 3% and packed in retail packs.

It is possible to produce about 6 kg of sugar from 35 litres of Neera in 4 hours. The production capacity per day is 20-30 kg of coconut sugar with a monthly output of 1 MT. The unit also produces coconut sugar syrup and block sugar. The unit supplies directly to the retail chain "Carrefour" at the rate of 300-400kg per month. The consumer preference is more for 300 gram packs of coconut sugar and 200 gram packs for block sugar. The price of coconut sugar is around IDR 15000 per kg.

With the guidance of local government unit, Darsim's processing unit is currently undergoing expansion with inclusion of more palms for Neera tapping. In addition to developing clean and hygienic kitchen, they plan to use LPG fuel to concentrate the Neera. This method will eliminate chances of contamination. This unit is not certified organic and has plans to undertake certification with support from the Regency government. The unit is participating in an International Exhibition in China with support from the Ministry of Cooperatives.

Some coconut sugar trading companies that collect the processed coconut sugar produced by the member farmers maintain quality standard of coconut sugar by undertaking necessary processes. First the coconut sugar is sieved for impurities and foreign bodies, then oven dried to a uniform moisture of 3%, sieved again for granular sugar of uniform size, passed through metal detector for removal of foreign metallic bodies and packed in bulk bags of 25 kg.

One of such company units has a production capacity of 400 MT certified organic coconut sugar per month. The price for certified sugar is higher than that of non certified sugar(usually with IDR 3000 difference). The current price of certified coconut sugar is IDR 13500 per kg while that of non certified is only IDR 11000 per kg. The owner of this company, Harun Effendi, indicated that the coconut sugar market is good, price is good and stable and there is increased demand. Due to these reasons, the owner is not interested to venture into other potential products like virgin coconut oil. Instead, adding other related products like liquid coconut sugar to his product basket is the strategy planned.

Dwarf Coconut Variety Ideal for Coconut Sap Tapping

To maintain the sustainability of coconut sugar industry, the Banyumas Regency embarks on coconut replanting and rejuvenation program. The Regent Achmad Husein plans to plant 1 million coconuts in four years. About 10% of coconut stands now are senile and unproductive. Last year 85,000 seedlings of dwarf coconuts were distributed. This year 100,000 seedlings will be distributed. Dwarf varieties are preferred because it is easier and safer for tapping. With these varieties casualties from neera tapping can be eliminated.

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FUTURE OF COCONUT: NOTE TO POLICY MAKERS

Dr. Lalith Perera and Dr. I M S K Idirisinghe

Coconut was once the most demanded edible vegetable oil in the world market, for its taste, long shelf life and for other quality attributes. Coconut lost its reputation in 1960s because of the erroneous conception that consumption of coconut oil leads to heart diseases. Coconut oil is designated as a saturated fat along with animal fats without considering that coconut oil is one great source of Medium Chain Fatty Acids (MCTs; 62-65%). MCTs are absorbed and digested easily and converted into energy quickly. So unlike animal fat which comprises large proportion of Long Chain Fatty Acids (LCTs), coconut oil does not have a tendency to being stored as fat or raise cholesterol in the body and thereof is not harmful to human health. The misconception about coconut is now completely demolished and instead many health benefits of coconut have been discovered.

Coconut, in the form of virgin coconut oil (VCO) and coconut water have an emerging and expanding market world over. The 2015 export and import of commodity data indicated that there was a growing market for coconut oil in USA, China, Korea and the European Union. The global coconut water too has a market expanding robustly. Global coconut water consumption hit 3.9bn liters in 2015. Coconut water market in USA continue to boom. The global coconut water market suggested that there are several other markets that hold even further potential. In the UK, coconut water is quickly catching up to the US and estimated to become a £100 million retail category. Japan has the potential to be worth almost $500m by 2019 as coconut water directly appeals to on-going demands for functional wellness products. Findings showed that much higher growth in coconut water consumption is expected from France, China and Canada and there are certain other untapped opportunities. The coconut producing countries must therefore think seriously on these newly opening markets for coconut. Brazil is the world leading coconut water processing and exporting country in the world today. On the other hand, desiccated coconut (DC) and coconut byproducts such as coir and shell products also continue to retain their demand in the international market. It should also be borne in mind that compared to the present small international market creating for the emerging coconut products, the value added traditional coconut products such as DC still have a big international market.

High quality Virgin Coconut Oil produced by Coconut Research Institute (CRI) of Sri Lanka.

The White Coconut Cake, the by-product of the Virgin Coconut Oil is a rich source of natural dietary fiber. (source: Coconut Processing Division, Coconut Research Institute, Sri Lanka)

Launching of Sera Coconut Milk 180 ml pack by Ceylon Biscuits Ltd. (CBL), Sri Lanka (Source: The Sunday Times Newspaper, Sri Lanka, 3 January 2016)

King Coconut Variety in Sri Lanka, a Potential Beverage Coconut Variety for Export Market as Fresh Tender Nuts

Any other novel value added coconut product at present will have a very tiny market share. However, for the countries which have not yet shifted to at least the basic value addition steps like converting copra into oil, it is time for them to change. This recent stimulated and upstretched coconut market and the already opened up for value added traditional coconut products together lay foundation for profitable coconut cultivation in coconut growing nations.

The coconut production in most of the coconut growing countries is however, stagnated mainly because of the poor management of coconut lands and the overage and senile nature of most of the plantations. Besides, most of the countries, a higher proportion of production is domestically consumed, for example, Sri Lanka consumes 70% of its production, thus leaving only around 800 million nuts for the industry catering to export market. Therefore there is a need to increase coconut production in coconut growing counties.

Of the many ways to increase coconut production, productivity increase in existing coconut lands is an imperative way. Majority of the coconut palms in coconut growing countries are poorly managed. Preparedness for the drought by farmers is very poor and even simplest practice of putting up mulch around the palm to conserve moisture is practiced only by a small proportion of farmers. This attitude can be changed by giving a better farm-gate price for coconut for producers. This will motivate growers to manage their coconut lands healthy and thereby increase production. However, consumer and entrepreneur protection is also equally necessary. This can be achieved by each country developing a mechanism to predict their national coconut yield well in advance and based on predicted production figures, adjusting import tariff of other edible oils or other coconut based products and/or switch on and off their other coconut based exports other than the major coconut export commodity. For example,

DC is the major kernel based export commodity of Sri Lanka, international price of which is often controls the farm-gate price of coconut. When there is a surplus production in the country, the demand for coconut by DC industry becomes less, resulting in low farm-gate nut price. This sometimes, goes to an extreme extent that the cost of production of a nut is higher than farm-gate nut price. When higher production is anticipated through yield prediction, the import tariff of other sources of oil is increased in the country leading to local oil production boosts absorbing the surplus nuts. If further actions are necessary, export tariff or other coconut products are relaxed, for example for fresh nut or tender nut export, further removing predicted surplus nuts from the local market.

Scientific management of coconut lands using improved cultural practices, rehabilitation of existing coconut lands, replanting senile coconut trees with genetically super seedlings are other important considerations in increasing coconut production. Any government subsidy schemes should be directed towards such activities. Land suitability maps for coconut should be prepared in each country and based on the land suitability classes, coconut cultivars to be planted and management conditions to be adopted should be decided. For example, in Sri Lanka, land suitability classes guides growers to decide where to plant coconut and where to effectively plant early bearing and high yielding hybrid coconut. Hybrid coconuts when planted in right place with right management conditions, give 40 to 50% more yield than tall coconut cultivars.

Expanding coconut cultivation to non-traditional areas is another important strategy in increasing yield by expanding land area, but it has to be done with great care. The potential lands should be identified not just based on the suitability of soil conditions but also based on the suitability of climatic conditions (i.e., temperature and rainfall) and the availability of water that seriously affect the yield of coconut palm. Sri Lanka has had bad experience in expanding coconut cultivation to certain parts of the dry zone, where coconut production was seriously limited by high temperature and

low rainfall and to a great extent by combined effect.

It is noted that in countries where considerable proportion of coconut production is used for local consumption, a large part of their production is wasted due to less efficiency in extracting coconut milk in households. If this can be side-stepped, a large number of nuts can be saved and directed to the industry. For example, it has been calculated that around 750 million nuts can be saved in Sri Lanka by this way only. One way to do this is the processing of coconut milk (or milk powder) within the country and then mind set consumers to buy locally produced coconut milk for their day to day use. These processed coconut products however should be made available at an affordable price and in a convenient sized containers and even as sachets.

In Sri Lanka, the tradition of housewives is to buy or use own coconut, de-husk and scrape them at home and squeeze milk by hand and use them fresh for food preparation. This is a labour intensive and a time consuming process too. Presently, there are two leading food manufacturing companies in Sri Lanka which recently launched a hygienically produced premium liquid coconut milk in UHT packs with about one year shelf life to the local market. Their products seemed to be slowly and steadily gaining popularity among the local consumers, because of the convenience in use and reasonable price. This market trend, additionally help coconut byproduct manufactures by gathering husk, shell and water in one place, making these byproducts easily accessible to them as raw materials for their industries, which otherwise would have ended up as waste in households.

The hygiene in production and the quality of coconut products are other important considerations in coconut processing industry in order to remain in the international market. Therefore, better and well administrated quality control system needs to be in place in each country for all coconut based products.

Further, a well-planned and well-coordinated research programme aiming towards the wellbeing of the coconut industry in each country, fitting in with local needs and problems and an effective and efficient dissemination of research findings as recommendations to the growers and entrepreneurs are also important aspects in coconut development programmes in coconut growing countries.

However, much attention should be given for applicability and practicability and the cost of recommended practices before a recommendation is given to the farmers. In that respect, frequent face to face dialogues between researches and extension officers and between researchers and growers are of paramount importance. Carrying out periodic diagnostic surveys to find out how well the technologies are adopted or vice versa by farmers and the problem associated with those recommendations are also important elements in a well-directed research programmes. The institutes carrying out research programmes need to be strengthened and freed from political interferences. Scientists and other key officers engaged in coconut research and development should be consulted in the policy development and decision making processes of respective governments.

Coconut water manufactured by Silvermill Group of companies in Sri Lanka for Vita Coco brand, using fresh nut water harvested from Sri Lanka Tall coconut variety.

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THE EFFECT OF ORGANIC AND INORGANIC FERTILIZERS ON GROWTH & YIELD OF COCONUT (*COCOS NUCIFERA L.*): A REVIEW

Dr. M Abdul Hameed Solangi, M.Z.Iqbal, and Aqeel Ahmed Siddiqu

Introduction

Coconut, (*Cocos nucifera* L.) is grown in nearly 90 countries spread throughout the tropical regions of the world. There are about 10 million families which rely on the coconut as their main source of food and income. 11.9 million hectares of coconut are grown in the world, eight million hectares, or about 70% in South East and East Asia (Harries, 1978 and Carpio *et al*., 2005). The coconut is a perennial crop which produces oil rich in lauric acid, and is one of the most important food and cash crops grown in the humid tropics. It is widely adapted to the environment of the coasts and lowlands of producing countries, notably occupying over 20% of the available arable land in many cases (Magat, 1996).

The Pakistan coast is an ecologically virgin area; has varied natural resources suitable to grow diverse crops. The area near the sea coast has a climate suited to a number of tropical fruit crops, including coconut (Laghari and Solangi, 2005). An average monthly rainfall of 150 mm is ideal for good growth and high nut yield. A prolonged dry spell lasting from five to seven months, as experienced in some parts of India, adversely affects production (Rajagopal *et al*., 1990).

According to international criteria (FAO, 1980) only 30 percent of the landscapes where the coconut is grown contain adequate organic matter. Beside many beneficial effects on soil properties and plant growth, soil organic matter is also linked to the availability of nitrogen.

Coconut Organic Fertilizer

Where the soil has low organic matter green manuring crops are usually grown, including for example cow pea, Sunnhemp, *Crotalaria juncea* and *Calopogonium mucunoides* (ICAR, 2004). The coconut palm often survives for 70-80 years, anchored to a spot from which it steadily removes available nutrients, which might become depleted within a few decades without replacements being added.

Balakrishna, (1975) investigated the effect of both inorganic and organic fertilizers mixtures on the yield. He concluded in the case of seedlings however that their non responsiveness to fertilizer could be due to the abundant supply of nutrients from the endosperm.

Inorganic and organic fertilizers differ in the availability of mineral plant nutrient that they contain. While nutrients from inorganic fertilizers are readily available to plant roots, nutrients from organic materials, particularly nitrogen, have low availability.

Organic materials (cattle manure, goat manure, broiler and layer poultry manure, farm yard manure, biogas residue, sewage sludge, compost (*Gliricidia sepium, Pueraria, Calopogonium* and *Acacia*) have considerable amounts of macro and micro-nutrients. These materials could potentially be used as a source of plant nutrients for coconut to supply adequate N, and part of the P, K and Mg requirements (Tennakoon and Bandara, 2003). The soil of some rain fed areas is particularly infertile because of its low organic matter content. Its health and sustainability can be enhanced through incorporating different organic fertilizers such as farm yard manure, poultry manure, neem cake, compost green manure (Gupta, 2003). Growing ridge and sponge gourd between the rows of coconuts increased the yield. The benefit cost ratio was positive when a recommended dose of NPK + 50% of farmyard manure (Nair and Nair, 2006) were used. The integrated use of organic and inorganic fertilizers increased mutual and enable a reduction in

The identification of specific characters in coconut which may contribute to its increased yield, adaptation to specific environment and production of products preferred by the consumers should be prioritized (Foale, 1992). So far the emphasis of studies on coconut has been mainly on simple cosmetic and morphological descriptions such as color, size and shape of the fruit, robustness of the trunk, and crown size (Child, 1964; Ohler, 1984). Relation between leaf (frond) length and yield in coconut indicated that a palm with longer leaves and more leaflets would show higher yield (Abeywardena, 1976).

The aim of the present research is to investigate the effect of organic and inorganic amendments on morphological diversity and yield of adult coconut along with comparative performance of different organic and inorganic soil amendments on the coconut seedlings. Therefore, this study was undertaken to find out the suitable and economical dose of fertilizers for coconut palm, observing morphological characters/growth rate and nut production in coastal areas of Pakistan.

Review of Literature:

(1) Importance of organic manures

Organic manures are a potential nutrient pool from where both macro- and micro-nutrients are released slowly in available forms. Maximum yield and root growth of many crops are achieved when organic manures are used in combination with inorganic fertilizers (Spartt and Muever, 1980). According to Venkitaswamy and Khan, (2002) composted coir pith treatment leaf K content to 2.07% from 1.55% in the 14th leaf. Maheswarappa *et al.,* (1998) noted that among organic manures, farmyard manure and vermicompost applied alone, and a combination of farmyard and NPK treatments increased growth. Tennakoon, (1990) observed that applying 20 kg goat manure/palm annually increased some nutrients by 45% and improved the microbiological activity and water holding capacity. Organic fertilization dates back to the old practice of Chinese farmers who used it to conserve soil fertility and to ease soil cultivation. The soil is significantly affected due to raised organic matter which improves the physical conditions, nutrients status, and biological properties (Tennakoon, 1988).

The importance of organic manures as a source of humus and plant essential nutrients to increase the fertility level of tropical soils has been well recognized. The organic matter content of cultivated soils of the tropics and sub-tropics is comparatively low due to rapid break-down in response to high temperature and intense microbial activity. Therefore, humus needs to be increased through the periodic addition of organic manures, thereby maintaining crop productivity by substitution for inorganic fertilizers (Meelu and Singh, 1991).

For optimal utilization of soil moisture and available nutrients, an efficient root system is essential. Besides absorption of nutrients and water, roots perform function of anchorage and storage. Neem trees were treated with ground application of fertilizers; foliar sprays with NPK while micronutrients were also applied to help fast growth of the trees (Panhwar, 2005). Agyarko *et al*., (2006) reported that soil nutritional levels increased with poultry manure and increased levels of neem leaves. Mendez - Bautista *et al*., (2009) studied the effects of neem leaf extracts on green-house gas emissions and inorganic nitrogen in urea amended soil and reported that the leaf extract had no significant effect on urease, but may limit nitrification. Kumar *et al*., (2007) used neem oils to coat urea and added it to sandy loam soils resulting in some nitrification inhibition as well.

Maheswarappa *et al.,* (2000) investigated the influence of factors such as soil temperature, arial temperature and rhizosphere environment in order to understand the reasons for lower arrow-root productivity. Among the different fertilizer treatments studied, growth, and yield of arrowroot responded to a farmyard manure + NPK combination followed by farmyard manure and vermi compost. Essential oil and oleoresin contents were significantly higher compared with the control and composted coir pith treatments. Marimuthu *et al.,* (2001) reported in coconut that application of 50 kg farmyard manure, along with the recommended dose of NPK, increased N, P and K contents in both soil and leaf, with a 47% increase in nut yield compared to the control.

Tennakoon and Bandara, (2003) observed that organic material (cattle manure, goat manure, broiler and layer poultry manure, pig manure, farmyard manure, bio-gas residue, sewage sludge, compost (*Gliricidia, Pueraria, Calopogonium* and *Acacia*) have considerable amounts of macro and micronutrients. These materials could be used as a source of plant nutrients for coconut, to supply the N requirement in full and P, K and Mg requirements in part. Solangi & Iqbal (2012) investigated that combined treatment of inorganic and organic {NPK + Neem seed powder (NSP) + *Gliricidia*

sepium leaves (GSL)} significantly increased most of the morphological characters of coconut seedlings.

Subramanian *et al.,* (2005) investigated that the leaves of *Gliricidia sepium* decomposed relatively fast, providing nitrogen and potassium. The application also improved the soil moisture availability as compared to the application of inorganic fertilizers alone. Suja *et al.,* (2004) conducted the study on the influence of three organic manures (farmyard manure, coir pith compost, green manuring *in situ* with sunnhemp) and three levels each of N and K (40, 80, 120 kg /hectare) on the growth, yield and economics of cultivation of white yam as an intercrop in a coconut garden. Application of coir pith compost and high rates of N and K promoted canopy growth. There was no conspicuous reduction in weight, length and girth of tubers as well as tuber yield due to application of different organic manures, which implies the suitability of coir pith compost and green manure as possible alternatives to farmyard manure. Tuber yield response was pronounced up to 80 kg nitrogen /hectare and 120 kg potassium /hectare favored the yield components. The N, K ratio of 1:1 proved to be ideal for economic yield. Application of coir pith compost @ 5000 kg /hectare along with 80 kg N, 60 kg P_2O_5 and 80 kg K_2O/ hectare maintained higher tuber yield and generated higher profit and benefit cost ratio. On the whole coconut-white yam intercropping system proved profitable due to generation of additional employment and higher net income besides providing high-energy secondary staple.

Ranaweera *et al.*, (2010) investigated that cattle manure contributed a high level of Mg to the soil, and hence possible to recommend cattle manure as a good source of Mg. Significantly improved microbial activity was observed in biogold and the compost treatments. This implies that organic fertilizers are more environmental friendly compared to inorganic fertilizers. Liyanage *et al.*, (1993) studied that the use of husk and coir dust was beneficial to coconut production. This was partly attributed to their ability to retain moisture in the soil and to cause regeneration of more roots per unit area. In terms of the copra yield/palm coir dust appeared to be more effective than husk in soil. Based on these results, use of coir dust in pits is recommended as an effective alternative to husk pits for soil moisture conservation. It was also found that the coconut palms in the integrated system yielded 17% more nut and 11% more copra, while maintaining the nutrient status of the palm above the critical level despite reduced application of fertilizer. Recycling of animal excreta improved soil fertility by providing organic carbon, total nitrogen and available phosphorus. The integrated system was economically viable in comparison with monoculture. Mohankumar, (1996) pointed out that the growing of green manure crops in coffee could prove an effective alternative to fertilizers for improving soil fertility status especially in areas of high rain fall where soil erosion and loss of fertilizers in the run off is high.

Jaganathan, (1992) studied that the coconut water has been widely used as a diagnostic tool on coconut nutrition, a comparison of nut water analysis with leaf analysis showed that nut water analysis was sensitive to Na and K, but not to Ca and Mg. Bhaskaran, (1993) reported that root treatments of coconut palms infected by *Ganoderma Lucidum* with Tridemorph at quarterly intervals for one year combined with yearly application of 5kg neem cake / tree, reduced disease incidence and increased yield by 132%.

(2) Importance of inorganic fertilizers

Most cultivated lands need regular supplies of mineral nutrients, especially after having been cultivated for some time. When planting or replanting coconut on land previously cultivated, fertilizer application to the seedlings is important for the productivity of the tree, as it increase the rooting surface. With good nutrition, the stem will also attain its maximum width (Ohler, 1999). Cecil and Khan, (1993) observed that in general the effect of N on vegetative growth of young palms was high, followed by K, whereas P showed a favorable interaction with N and K.

Senthurpandian and Venkatesan, (2006) observed that higher nitrification resulted in lower ammonification and vice versa. The efficiency of mineralization was observed to peak between 70 and 90 days. A drastic change in the mineralization pattern was noticed when organic manure was added along with synthetic fertilizers like urea and ammonium sulphate, i.e., the mineralization potential was observed to peak on 35^{th} day itself, instead of 70^{th} or 90^{th} day as observed in case of application of organic manure alone. The difference between the influence of urea and sulphate of ammonia on nitrogen mineralization was negligible.

Teixeira *et al.,* (2005) noted that the effect of N rates was negative on water volume production in fruit, weight and number of fruits per bunch, whereas application had a positive effect on these variables, P and K concentrations in the coconut water increased with P and K application,

otherwise the treatments had no effect on flavour. Phosphorus application had no effect on fruit production. Solangi (2013) reported that the source of amendments included Urea for Nitrogen; Di-ammonium phosphate (DAP) for Phosphorus and Muriate of potash for Potassium in combination (NPK). Neem seed powder (NSP) and *Gliricidia sepium* leaves (GSL) at different levels were applied and resulted in the best coconut growth and production. Mathewkutty *et al.,* (1997) analyzed foliar nutrient content, which was correlated with yield. The nutrients limiting yield were not the major nutrients, which are regularly applied in fertilizers. Amalu (1999) noted the the growth performance was generally poor in un-fertilized palms, compared to a combined application of 4.41kg ammonium sulfate plus 2.52kg KCl/palm/year which resulted in the best growth over 21 months. Aldaba, (1995) reported that recommended remedies included a better choice of varieties and hybrids, greater use of fertilizers and supplementary ground cover, increased irrigation and improved retention of water in the soil.

Coconut Seedlings

Mongia and Bandyopadhyay, (1993) noted that foliar yellowing of coconut palms due to nitrogen and potassium deficiency where the soil was inherently poor in these nutrients. Fertilizer application is recommended to improve yield. Bonneau *et al.,* (1993) indicated that growth and fruit set increased significantly when the standard N fertilizer rate was doubled, and was greater with P and K at standard rates than with no fertilizer. Calcium, magnesium, chloride, sulfur, boron and zinc had no effect on growth. There were positive interactions between N and P and N and S fertilizer and a depressive effect of K fertilizer on Mg content. Chandha and Nair, (1998) observed that soil physical, chemical and nutrient constraint encountered under varying climatic conditions in individual crops are cited. Fertilizer recommendations supplemented with organic manure's to boost the production of coconut, cashew, mango, citrus, clove, nutmeg and cinnamon. The most yield-limiting nutrient appears to be K followed by N. The scope for high-density planting, inter-cropping, checking erosion and biomass incorporation into the soil is highlighted.

Bonneau *et al.*, (1997) studied that coconut palms display a considerable response to sodium chloride applications, affecting all the yield components (growth, flowering, number of nuts, nut size) as well as resistance to water stress, at all stages and under a wide variety of soil and climatic conditions. Sodium chloride can be used to replace potassium chloride as it is much cheaper and more readily available. Sodium chloride is therefore set to become the main component in fertilization for coconut in certain environmental situations

Secretaria and Maravila, (1997) reported that the palms given ammonium sulfate + Kcl, and goat manure treatments, had significantly improved vegetative growth, started bearing earlier and had higher yield than those given other organic fertilizers, and unfertilized palms. Using inorganic fertilizers failed to improve poor physical soil conditions. The application of fertilizers containing Cl also made the palms more resistant to drought, whilst organic fertilizers (particularly goat manure) improved the fertility and physical condition of the soil. It was also noted that during the later years of production, organic fertilizers should be combined with Cl fertilizers to sustain high yield and increase drought tolerance.

Joseph *et al*., (1993) observed that the greatest increase in yield was 14 percent, obtained with an annual application of 500g muriate of potash + 500g common salt /palm. According to Ahmed, (1993) the fruit yield were greatest with farmyard manure, followed by 20 tones coir-pith/hectare and were lowest in the control. Leal *et al*., (1994) observed that the vegetative growth and disease incidence

were evaluated by the number of missing and live leaves, stem girth and the number of stomata in 6 leaflets of leaf 7 in the first year and leaf 10 in the second year. P and K had an effect on vegetative growth.

Devasenapathy *et al*., (1996) observed that the application of sodium chloride at 1kg/palm/year along with the recommended dose of NPK had significantly influenced the growth, nut characteristic and nut yield. There was no residual sodium available in the soil to cause sodium toxicity after application. Resende *et al*., (1991) reported that various fertilizers (NPK, lime, castor bean cake meal) were used singly or in combination with monthly spray of benomyl at 1.32g/palm. Irrespective of the fertilizer used, benomyl reduced the disease incidence and increased yield.

Nath *et al.,* (2003) investigated the significance influence of the main effect of N, P and K on mean number of fully opened leaves in the crown, number of female flowers/ palm, nut setting, nut yield/palm/year and cumulative nut yield for eight years. Organic carbon concentration increased with increasing N-application, while a reverse trend was noticed with respect of K and P application. Available N values followed the same trend as that of organic carbon. Soil available P status improved markedly with increasing P levels in the surface soil. However, at greater soil depth the available P content did not vary significantly. The available soil K increased with increasing level of K application at all the soil depths investigated.

Singh *et al.,* (2004) conducted experiments on the effect of integrated nutrient management of a coconut-based farming system on yield. Hybrid napier forage NB-21 grass treatment increased from 42 to 67 nuts/palm/year (2001-2002). In PBN-16 grass treatment the yield fell slightly from 80 to 78 nuts/palm/year although the difference was non-significant. The soils receiving only organic manures showed a steady pH value over three years, while plots receiving inorganic fertilizers showed a lower pH. There was a slight increase in the organic carbon content in the manure applied plots especially in coconut basins. Nitrogen content at a depth of 30 to 60 cm in the coconut basins was found to be high in the plots receiving only inorganic fertilizers. Venkitaswamy *et al.,* (2006) revealed that the soil available Zn, Cu, Fe and Mn were not statistically different among the NPK levels even after continuous application for a period of 12 years. Acharya and Dash, (2006) determined that it was extremely difficult to define standard nutrient contents with wide application because of variations due to crop species, variety, age of plant, growth stages, climate, crop management and soil properties. It should only be confined to a particular cultivar under closely defined conditions. It was concluded that application of fertilizers mixture containing 1000 g N, 250 g P and 1000 g K/palm/year in two equal amounts in pre and post-monsoon period promoted yield of hybrid coconut palms in the alluvial plants of west Bengal. Moss, (1992) reported that palms receiving K fertilizer intercepted more light and had a higher rate of leaf area growth after the dry season than the control. Davis *et al*., (1990) reported that when the fertilizer were applied in equal doses at 6-month intervals the Low N+ low K and high N + high K application increased nut yield by 61 and 92% respectively. The NK combinations significantly increased the yield whereas P and Mg application did not . Sreekala and Jayachandran, (2006) reported that the application of organic manure (farmyard manure, *vermicompost*, neem cake and green leaves) and microbial inoculants (*Arbuscular mycorrhizal* fungi and *Trichoderma*) microbial inoculants combination enhanced the uptake of N, P and K.

Conclusion

The benefits of balanced fertilization using crop residues, organic manures and green manuring in maintaining the levels of organic matter in agricultural soils have been increasingly supported by experimentation. The Neem soil amendment has value as a fertilizer and as a systemic pesticide. The soil of coastal areas is sandy and low in macro and micro nutrients especially on the Karachi Coast. The application of organic material, amended with inorganic fertilizers, enhanced growth and leaf production in the case of nutrient deficient soils. It is therefore, recommended that treatment {NPK (1.0:0.5:1.0 kg) + NSP (10.0kg) + GSL (20.0kg)} /palm/year was enough to increase the number of leaves, increase income to coconut farmers, and provide economic and conservation benefits in coastal area of Pakistan.

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PROTECT AND RESTORE YOUR VISION WITH COCONUT OIL

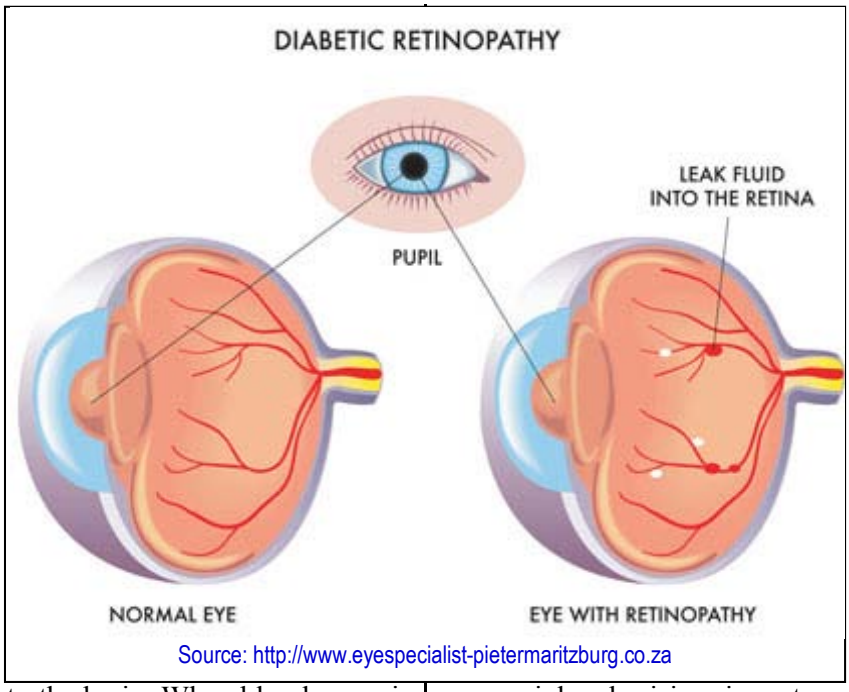
Dr. Bruce Fife

If you are concerned about losing your eyesight to diabetic retinopathy, cataracts, glaucoma, macular degeneration, or other age-related degenerative eye disorders, coconut oil may provide a solution for you.

Vivian was diagnosed with diabetes 20 years ago at the age of 58. "To be quite honest," says Vivian, "when I was first diagnosed I don't really remember what I was told. I think I was so shocked to realize I was falling prey to diabetes, a disease I thought I would never get. I was always a healthy person & was never sick." Today Vivian manages her condition with four injections a day: two of insulin and two of Byetta—a drug to help control blood sugar.

Ten years ago, she was diagnosed with diabetic retinopathy—a degenerative eye disease brought on by her diabetes. "I was not prepared for vision problems," says Vivian. "The doctor who first treated me for diabetes didn't mention that I needed to take care of my eyes. He didn't suggest that I should go and see an ophthalmologist every year for a checkup. I don't think too many people know that you can lose your vision to diabetes. I've heard of people who have had legs and other limbs amputated, but I didn't know it could affect your eyes."

Vivian suffered with cataracts for several years but didn't realize her diabetes was affecting her eyes until after she had cataract surgery. Her doctor informed her that she had diabetic retinopathy and had already lost some vision as a result of it. Diabetes initiates degenerative changes in the blood vessels in the retina—the photosensitive cells at the back of the eye that relay visual messages to the brain. When blood sugar is poorly controlled these blood vessels leak fluid and blood into the retina. The retina swells with fluid and vision blurs and can be lost entirely. Diabetic retinopathy is the leading cause of blindness in individuals age 20-65. Vision loss is usually permanent. Vivian was advised to seek treatment as soon as possible.

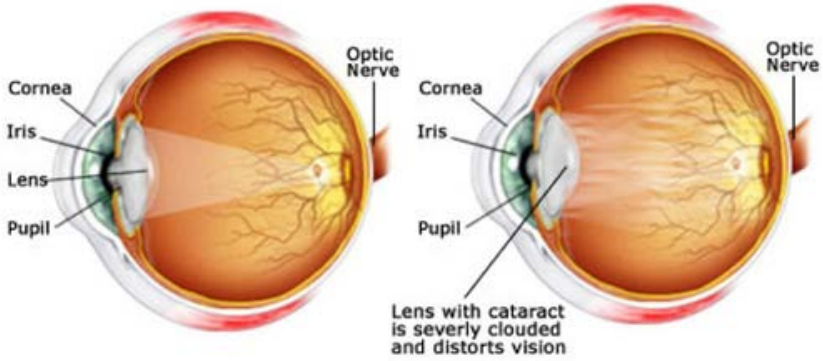


Source: http://www.eyespecialist-pietermaritzburg.co.za

"I found an ophthalmologist who specialized in laser treatments. He gave me the biggest hope. He told me that although I had a problem with scar tissue, he would try to fix it. I had an operation, called a vitrectomy, and this helped to remove some of the scar tissue. I'm still considered legally blind, but I can see—I just don't see clearly. I can see an entire person when they're standing in front of me but I don't see them clearly, and my peripheral vision is not so good. When someone comes up from behind me and stands to my side, I don't always notice them."

Vivian admits she still likes to indulge in ice cream and fruit at times even though these foods raise her blood sugar levels. My vision changes along with my blood sugar levels," she says "For example, I take 46 unites of insulin in the morning and 20 at night. So, suppose at lunch time I decide to eat a lot of fruit, which I'm not supposed to because of the high amounts of sugar, then my sugar jumps up and my vision will change [become blurry]. By the time night comes around, my sugar drops and I can see better."

The longer a person has diabetes, the more likely he or she is to develop retinopathy. Almost



Source: https://www.lenspick.com/blog/vision-problems-in-aging-adults/

everyone with type 1 diabetes and most of those with type 2 diabetes will eventually develop retinopathy. Nearly half of those diagnosed with diabetes already have some stage of retinopathy.

Retinopathy can develop without any noticeable symptoms. The retina can be damaged before the person notices any change in vision. Blurred vision may occur when the retina swells from leaking fluid. At first, a few specks of blood, or spots may also interfere with vision. Sometimes, without treatment, the spots clear, and the person will see better. However, bleeding can reoccur and cause severely blurred vision and scaring. If it advances, risk of permanent vision loss is high. Despite taking medications to control her blood sugar, every time Vivian eats too much carbohydrate-rich food her vision becomes blurry, indicating leakage and swelling in her retina. Blurred vision is often one of the first signs of diabetes.

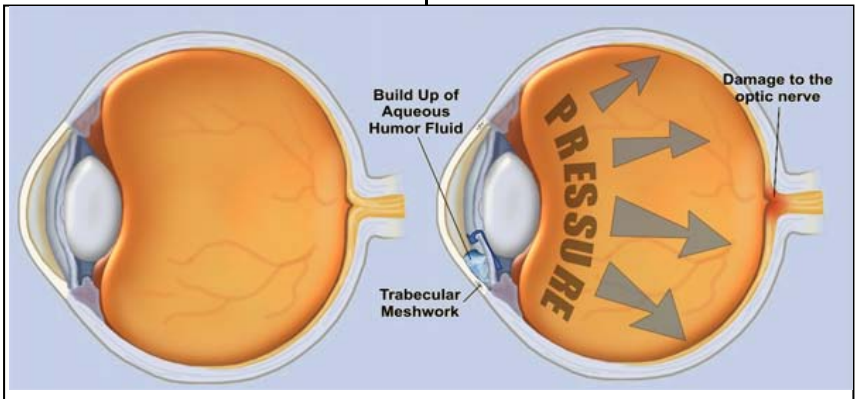
Diabetes is a major cause of disability leading to blindness, lower-limb amputation, kidney disease, and nerve damage. According to the American Academy of Ophthalmology people with diabetes are 25 times more likely to become blind than people without the disease. Currently 29 million people (9.3 percent of the population) in the United States have diabetes. Over 8 million are living with diabetes but are unaware of it. More than 26 percent of all adults age 65 and older have diabetes: that's one out of every four older adults! But it's not just an old-age disease; over 200,000 people under the age of 20 have been diagnosed with the disease as well. There are many more people, 86 million age 20 years and over, who are pre-diabetic. All of these people are at risk of developing visual problems at some point in their lives.

Diabetes not only causes retinopathy but also increases the risk of developing other visual problems such as cataracts, glaucoma, and macular degeneration. People with diabetes develop cataracts at an earlier age, and are nearly twice as likely to get glaucoma compared to non-diabetics.

Diabetes occurs as a result of the body's inability to properly regulate blood sugar. When we eat a meal, much of the food is converted into glucose, or blood sugar, and sent into the bloodstream. When blood sugar levels rise too high, the body can be thrown into a panic, metabolically speaking. The pancreas releases insulin into the bloodstream to shuttle glucose into the cells and lower blood sugar levels. However, if blood sugar is not normalized in a reasonable amount of time, cells and tissues become damaged. This is what happens in people with diabetes.

Ninety percent of all diabetics are type 2 or insulin resistant. Their cells have become unresponsive or resistant to the action of insulin so blood sugar has a harder time being transported into the cells. As a consequence, blood sugar levels remain elevated for extended periods of time. You don't have to be diabetic to develop problems. Even pre-diabetics are at risk. Any elevation of blood sugar is harmful to the eyes.

When insulin resistance is severe, it is classified or diagnosed as diabetes. Diabetes is diagnosed when fasting blood sugar—the blood glucose levels after an 8-12 hour fast—reaches 126 mg/dL (7 mmol/L) or more. In a healthy individual fasting blood sugar levels are generally no greater than 90 mg/dL. The higher the



Source: https://www.lenspick.com/blog/vision-problems-in-aging-adults/

blood sugar level is, the greater the damage being done. Chronic fasting blood sugar levels over 90 mg/dl increase your risk of degenerative eye disease.

If you have problems with cataracts, glaucoma, macular degeneration, or any other age-related eye disorder then you are most likely insulin resistant to some degree. For example, the higher a person's blood sugar is, the greater the risk of cataract. Researchers at Yale University studied the effect of three diets—high-carb, high-protein, and high-fat—on the incidence of cataract in diabetic rats. Development of cataracts was highest in the rats fed a high-carb diet; a lesser incidence was observed in the high-protein fed animals, while no cataracts developed in rats fed a high-fat diet. Although all the rats in this study were diabetic, their blood sugar levels determined the severity of cataracts they developed. The higher the blood sugar levels, the greater the incidence of cataract. When blood sugar was controlled by a high-fat, low-carb diet, no cataracts developed. This effect is not seen just in lab animals, in humans better blood sugar control has shown similar results.

Whether you are diabetic or not, eating a high-carb diet will elevate blood sugar and keep it elevated for extended periods of time and increase the risk of damaged to the eyes. Scientists working for the US Agricultural Research Service tracked 471 middle-aged women during a 14 year period. The researchers found that women in the study whose average carbohydrate intake was between 200 and 268 grams per day, which is typical for most normal weight women, were 2.5 times more likely to get cataracts than the women whose intake was between 101 and 185 grams per day. Although the consumption of 101 to 185 grams per day is lower than average, it is not considered low-carb. Low-carb diets generally include no more than 100 grams of carbohydrate a day and very low-carb diets restrict it to less than 25 grams daily. So even a modest reduction in carbohydrate intake, and corresponding drop in blood sugar levels, can significantly reduce risk of cataracts.

Fasting blood sugar measures the glucose levels at the time of testing. Another way of measuring blood sugar that gives an average over the previous three months is the A1C test. Researchers at the University of Oxford found that type 2 diabetics who lower their A1C level by just 1 percent can reduce their risk of cataracts by 19 percent. Even a small decrease in average blood sugar can make a big impact on eye health.

A study out of Tufts University in Boston showed that eating foods with a glycemic index above average is associated with a 49 percent increase in advanced macular degeneration.[4] The glycemic index is a measure of how quickly certain foods raise blood sugar levels. Those that raise blood sugar levels the most, like bread and sugar, are the most detrimental. Dr. Allen Taylor, the lead researcher in this study, said that the results found that at least 1 in 5 cases of advanced age-related macular degeneration (the only eye disease evaluated in the study) would likely have been prevented entirely by consuming a lower-carb diet.

You may be at risk of developing an age-related eye disease, even if you are not diabetic and have no known visual difficulties; we are all at risk. Degenerative eye diseases don't appear overnight. They take years, even decades to develop. Glucose metabolism becomes abnormal one to two decades before type 2 diabetes is diagnosed. In the meantime, the damage that can be done could be extensive before any symptoms become noticeable. Since no pain or sudden changes in vision are noticed, the gradual loss of sight is not easily recognized until substantial damaged has occurred. Waiting until symptoms appear may be too late.

The way to prevent or stop degenerative eye disease is to get your blood sugar levels under control. The standard medical approach to accomplish this is through medications. However, many people mistakenly believe

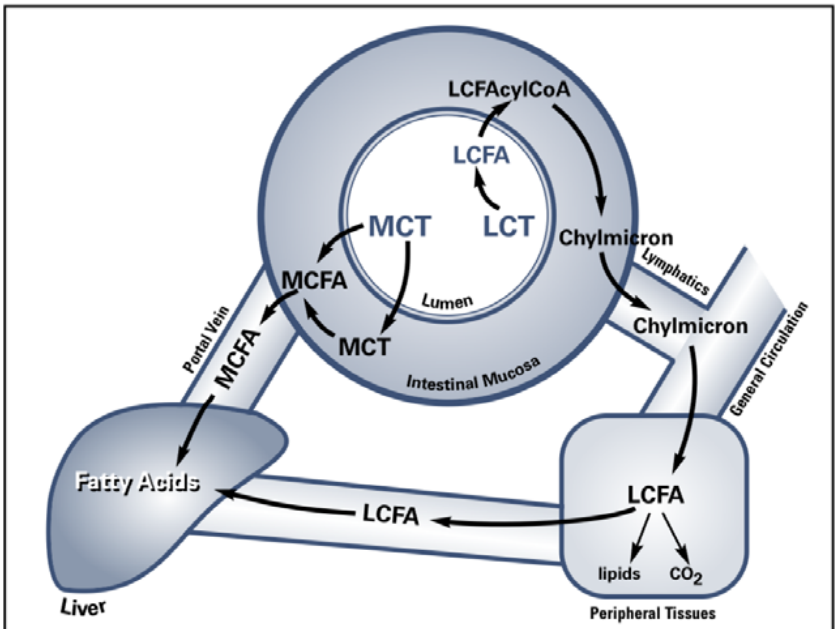


Fig. 1. Digestion and transport of fats. Note greater efficiency of absorption of MCTs versus LCTs, resulting in more rapid production of energy.

Source: http://nutritionreview.org/2013/04/medium-chain-triglycerides-mcts/

that as long as they take their drugs, they are protected. This false sense of security permits them into eat excessive amounts of carbohydrate, which causes high blood sugar. Vivian, whose story was told at the beginning of this article, took her drugs faithfully and still lost her eyesight because she continued to eat foods she shouldn't have.

A dietary approach is much better and doesn't require drugs. Even if you are severely diabetic you can get your blood sugar under control using a low-carb, coconut oil-based diet. A low-carb diet can help control blood sugar levels. Coconut oil, in addition to helping with blood sugar, can reverse much of the damage caused by chronic high blood sugar.

Coconut oil can work wonders in alleviating symptoms associated with insulin resistance. Studies show that the medium chain fatty acids (MCFAs) in coconut oil improve insulin secretion and insulin sensitivity. This means, coconut oil can improve cell sensitivity to insulin and lower blood sugar levels. In addition, coconut oil can help keep blood sugar from spiking after meals. When added to foods, coconut oil slows down the absorption of sugar into the bloodstream, thus moderating blood sugar levels.

Insulin resistance impedes glucose transport into the cells, essentially starving the cells, causing them to slowly degenerate and die. This is what leads to the major complications associated with diabetes. Blood vessels and capillaries degenerate and become leaky. Circulation is hampered. This leads to diabetic neuropathy (loss of feeling) in the feet and legs, which could progress to foot ulcers, gangrene, and amputation. It could also lead to a poor circulation to the eyes, the development of retinopathy, and vision loss.

Virgin Coconut Oil (VCO), A good source of MCFAs

Coconut oil can stop this degenerative process and restore the health and function of damaged blood vessels and capillaries, in the eyes. Unlike glucose or long chain fatty acids, MCFAs are not affected by insulin resistance. They do not require insulin to enter the cells. They easily diffuse across the cell membrane to provide the cells in the eyes with nourishment, allowing the blood vessels and capillaries to repair themselves and for proper circulation to be restored.

It has been estimated that up to 80 percent of the population has some level of insulin resistance (fasting blood sugar above 90 mg/dl) and that their cells are not absorbing glucose effectively. As a consequence, blood vessels and capillaries throughout the body are being damaged, which increases the risk of age-related eye disorders such as cataracts, glaucoma, macular degeneration, and diabetic retinopathy.

For this reason, it is a good idea to have your eyes examined periodically. Also, have your fasting blood glucose levels checked every few years. If your blood sugar is high, you can take steps now to correct the problem and greatly reduce your risk of experiencing vision loss later on.

For a more complete discussion on how coconut oil combined with a proper diet can prevent, stop, and even reverse degenerative eye disorders see my new book *Stop Vison Loss Now!*.

Dr. Bruce Fife is Certified Nutritionist and Doctor of Naturopathic Medicine, and Director, Coconut Research Center, based in USA.

FLAVOURED COCONUT JUICE- INNOVATION PAR EXCELLENCE

Geethu AS & Jyothi K. Nair

Source: http://www.coconut-info.net and http://www.cookatease.com

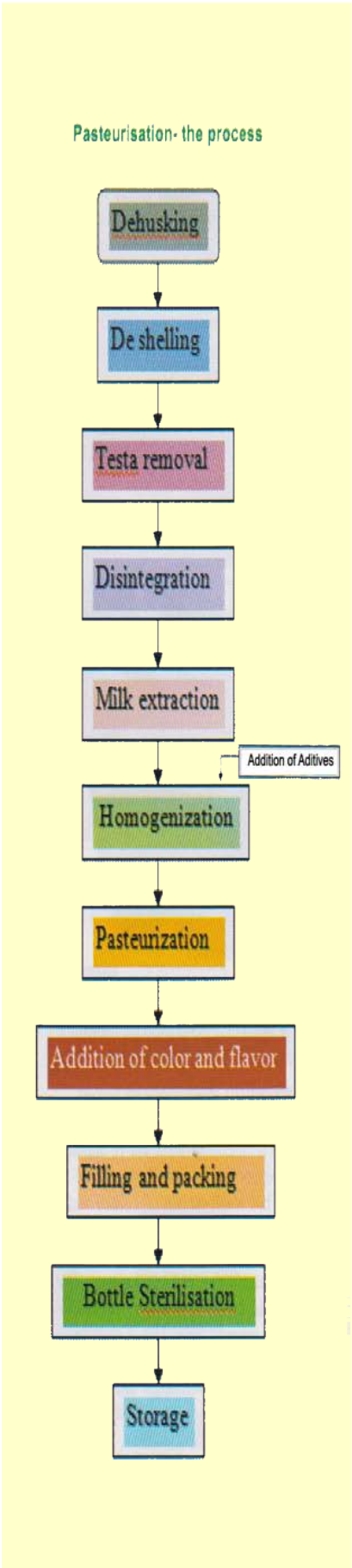
Within the overall dairy alternative drinks sector, there has been a rising interest and demand for plant based dairy alternative other than soy including cereals and nuts.

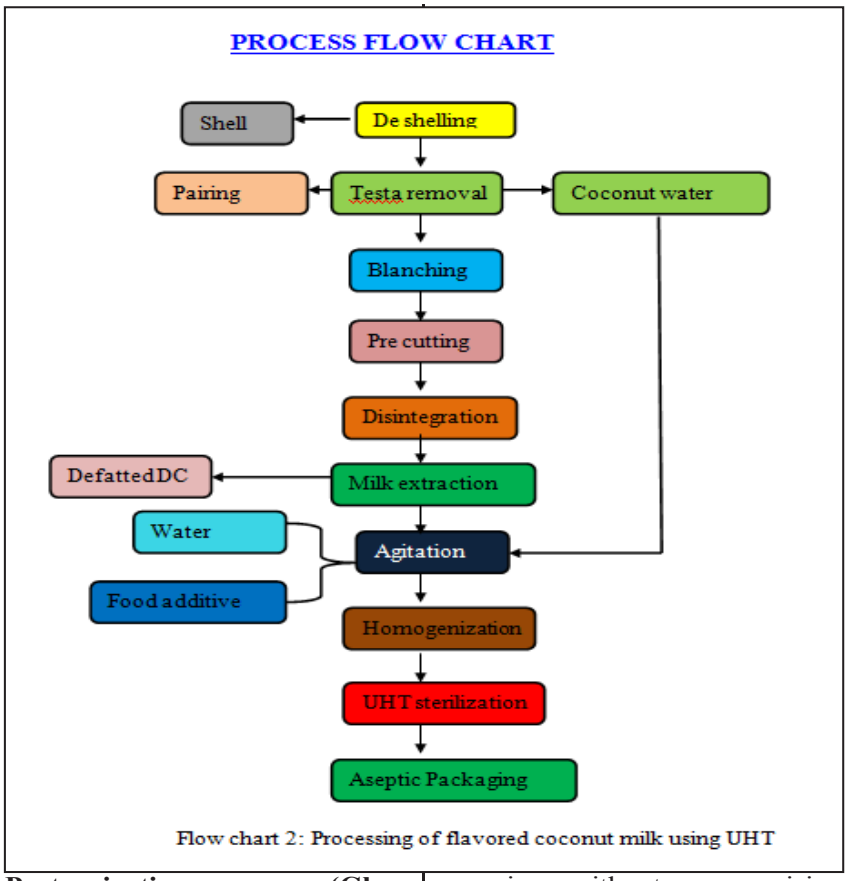
A new product in line with non dairy Ready to drink (RTD) is **Flavored Coconut Juice.** Coconut milk does not contain lactose and is low in carbohydrates than dairy milk, which can be consumed by people who are lactose-intolerant or those who doesn't like the taste of dairy milk. Coconut milk also has several nutritional advantages and serves as a superior source of several essential nutrients.

The Process

9-10 months old fresh coconuts are dehusked and deshelledsemi automatic/manually using hand tools. The deshelled coconut kernels in the form of round balls are pared using scrapers to remove the testa. The pared kernel balls are then cut open to drain off the water and then washed thoroughly in fresh water. The white coconut meat is blanched in hot water/live steam to bring down the microbiological counts. The kernel is then ground into a fine mass using disintegrator and milk is extracted using a milk extractor. Extracted coconut milk is mixed with coconut water and diluted by adding purified drinking water until it is appropriate for flavored coconut milk production. It is then mixed with sugar and permitted food additives. The flavored coconut milk is then heat treated to desired temperature and packed. The by-products like shell, defatted desiccated coconut and coconut peelings have good market value.

The processing methods adopted for flavored coconut milk production are pasteurization and filling in glass bottles/PP bottles and Ultra High Temperature (UHT) treatment. In both the processes, the pre-processing like dehusking, deshelling, testa removal, blanching, pre-cutting and milk extraction remains same.





Flow chart 2: Processing of flavored coconut milk using UHT

Pasteurization (Glass bottles/PP bottles)

Heating is done in a double jacketed vat and temperature is raised upto80° C for 10 minutes. Heating and cooling is done by spraying or circulating hot water /steam of chilled water between the inner and outer jacket of the vessel. The milk is kept gently agitated mechanically to ensure uniform heating/cooling. The temperature is designed to kill viable micro-organisms in coconut milk. This is considered adequate for destroying almost all yeasts, mould, and common spoilage bacteria and also to ensure adequate destruction of common pathogenic heat-resistant organisms.

UHT Sterilization

In Ultra High Temperature (UHT) treatment, the product is heated at 138°C -140°C for about 15 seconds and rapidly cooled to room temperature. This results in eliminating all the micro-organisms without compromising nutritional value of the product and making it safe. Main highlight of UHT treatment is that the product can be stored in room temperature. The modern technology like UHT saves labour cost and minimises production losses.

Why UHT?

With pasteurization, coconut milk is heated to 80^0C with a holding time of 10 minutes before it is cooled. Along with correct cooling, and chilled distribution, pasteurized milk has a shelf life of five to 15 days. In

UHT treatment, milk is exposed to brief, intense heating to temperatures in the range of 138-140°C for about 15 seconds. UHT treatment is a continuous process which takes place in a closed system that prevents the product from being contaminated by airborne micro-organisms. The UHT coconut milk passes through heating and cooling stages in quick succession and is immediately put into a sterile packing material (aseptic packaging). This process avoids any re-infection. The end result is a product that lasts up to six months without refrigeration or preservatives.

Project cost

The cost for setting up UHT plant for flavored coconut juice with a capacity of 4000 liter/shift is detailed below. The project cost involves the combination of land and building, plant and machinery, pre-operative expenses and working capital. The estimated project cost for the plant is calculated to be Rs.2.01 crores. The detailed broad item-wise breakup of project cost is given Table 1-3. One Rs is equal to …US$.

For a quality product, there is always a market which can be penetrated by offering competitive prices. The statistics shows that the innovation in non-dairy industry increased globally by 29%, while purchase of non-dairy milk instead of dairy milk by 48 %. Hence, it can be concluded that flavoured coconut juice can be the future vehicle of profit to coconut farmers.

Table 1.

Sl.No	Particulars	Amount (Rs. in Lakhs)
1	Land (50 cents)	-----
2	Building 4000 sq.ft (@ Rs.1000/- per sq.ft)	40.00
3	Other civil works	8.00
4	Plant & Machinery	111.00
5	Electrification	3.00
	Effluent treatment plant	10.00
	R.O plant	5.00
4	Preoperative Expenses	5.86
5	Working capital(margin)	18.40
	Total	**201.26**

Table 2. Land and Building

Sl.No	Particulars	Square Feet
1	Processing area	1200
2	Raw Material store	500
3	Finished goods store	600
4	Office room	600
5	Lab	500
6	Workers room	400
7	Reception	200
Total		**4000**

Table 3. Plant and Machinery

Sl.No.	Item	Qty	Unit	Unit Cost (Rs. In lakhs)	Amount (in Lakhs)
1	Desheller	3	no.s	1.5	4.50
2	Pairing unit	3	no.s	1.75	5.25
3	Washing	1	no.s	3	3.00
4	Precutter	1	no.s	2	2.00
5	Disintegrator	1	no.s	3	3.00
6	Screw press	1	no.s	3	3.00
7	Aquatic tank	1	no.s	1.50	1.50
8	Filter	1	no.s	3	3.00
9	Homogenizer	1	no.s	5	5.00
10	UHT	1	no.s	50	50.00
11	Packaging unit	1	no.s	8	8.00
12	Pipelines	1	lot	2	2.00
13	Diesel generator	1	no.s	5	5.00
14	CIP Unit	1	no.s	5	5.00
15	Laboratory equipments	1	lot	1	1.00
16	Plant IT system & networking	1	lot	3	3.00
17	Installation Charges &Labour	1	lot	5	5.00
18	Miscellaneous	1	lot		1.75
Total					**111.00**

Geethu AS and Jyothi K. Nair are Food Processing Engineers, CDB Institute of Technology, Vazhakulam, Aluva, Kerala, India.

Courtesy: Coconut Development Board, India.

IN DEFENCE OF OBSERVATIONAL SCIENCE: RANDOMISED EXPERIMENTS AREN'T THE ONLY WAY TO THE TRUTH

Kathryn Snow

Would you volunteer to become vegetarian for the next three decades for the sake of science? What if you were asked to run at least 50 kilometres per week, or live through a natural disaster?

Granted, these are extreme requests. Researchers conducting randomised controlled trials often ask volunteers to make far smaller changes to their behaviour: exercise a bit more, eat less sugar or try a new medication.

During these trials, scientists randomly allocate the medicine, treatment or activity being studied to a group of people, and a different intervention or placebo to another group. Then they look for differences in participant outcomes.

Purists believe experiments like this are the only way to gain valuable knowledge, and popular conception of science is intimately connected to experimentation.

Yet some of the most critical scientific questions we face today can't be investigated through experiment. For instance, we can't determine whether greenhouse gas emissions are really causing climate change by not producing them for several decades and recording the results. Likewise, many important medical questions either can't or shouldn't be settled experimentally. A chasm separates the controlled conditions of the laboratory from the messy reality of life. Sometimes, studying participants in real conditions through observational studies is the best way to find answers.

'Only an observational study…'

Epidemiology, broadly defined, seeks to understand the causes of disease.

An early example of observational epidemiology was John Snow's discovery that cholera was spreading throughout Victorian-era London not through bad air, as was commonly thought, but through contaminated water from the Thames. He did this by mapping the location of affected households which revealed they clustered around specific water sources.

Almost a century later in the 1950s, Richard Doll and Austin Bradford Hill were the first to observe the link between smoking and lung cancer by surveying doctors about their tobacco use and health. Smoking is now widely recognised as one of the most important modifiable risk factors for early death.

These contributions are often unrecognised by science journalists and even by other researchers. Newspaper articles on the latest finding from observational research often include some variation on the phrase: "only an observational study", as if this type of scientific inquiry is not to be trusted.

But each study should be evaluated on its own merits – not just its broad design.

In randomised controlled trials, randomisation is used to break the connection between characteristics to identify the true cause of a disease or the most effective cure. For instance, people who exercise frequently may have other healthy habits. These might be the reason for their lower risk of heart attacks, rather than the exercise itself.

Randomisation helps ensure people receiving a particular health intervention are a mixed group and the only thing they definitely have in common is the intervention itself.

Observational researchers can often use statistical techniques to identify the true causes of disease, even when different relevant factors are clustering together.

For instance, if we are worried people who exercise are less likely to smoke and this might explain their lower risk of heart disease, we can restrict our analyses just to non-smokers. Then if we still see a difference between people who exercise and those who don't, we can be sure it isn't due to smoking.

Instead of randomising, observational studies investigate how people live in their natural circumstances – how they behave, their genetic profiles, what's happened to them in the past, and so on. So many factors that have an impact on health can't be randomly allocated.

The value of observational research

The repetition of the "only an observational study" mantra ignores the fact that randomised studies are often impossible - for example, if we want to study the impact of genes, long-term patterns in diet or physical activity, personal experiences

like childhood trauma or incarceration, or natural disasters. Obviously, researchers can't randomly assign these traits or experiences to participants in a trial.

Observational studies have been used to identify the link between those who have the BRCA gene variants and their higher risk of breast cancer.

Now women with these gene variants can take some measures to protect themselves from advanced breast cancer. This contribution joins a long list that began with controlling cholera in London, and continued with identifying the harms of smoking.

The complexity of human beings means that medical researchers can't say with the perfect certainty of physicists that X causes Y, but the world can't always wait for perfect certainty.

Observational epidemiologists design studies with the greatest degree of rigour possible given the messy reality of life, and we offer our findings up in the hope of protecting public health. Every so often, that can be the difference between life and death.

Kathryn Snow is Epidemiologist, University of Melbourne.

Source: http://theconversation.com/in-defence-of-observational-science-randomised-experiments-arent-the-only-way-to-the-truth-49807

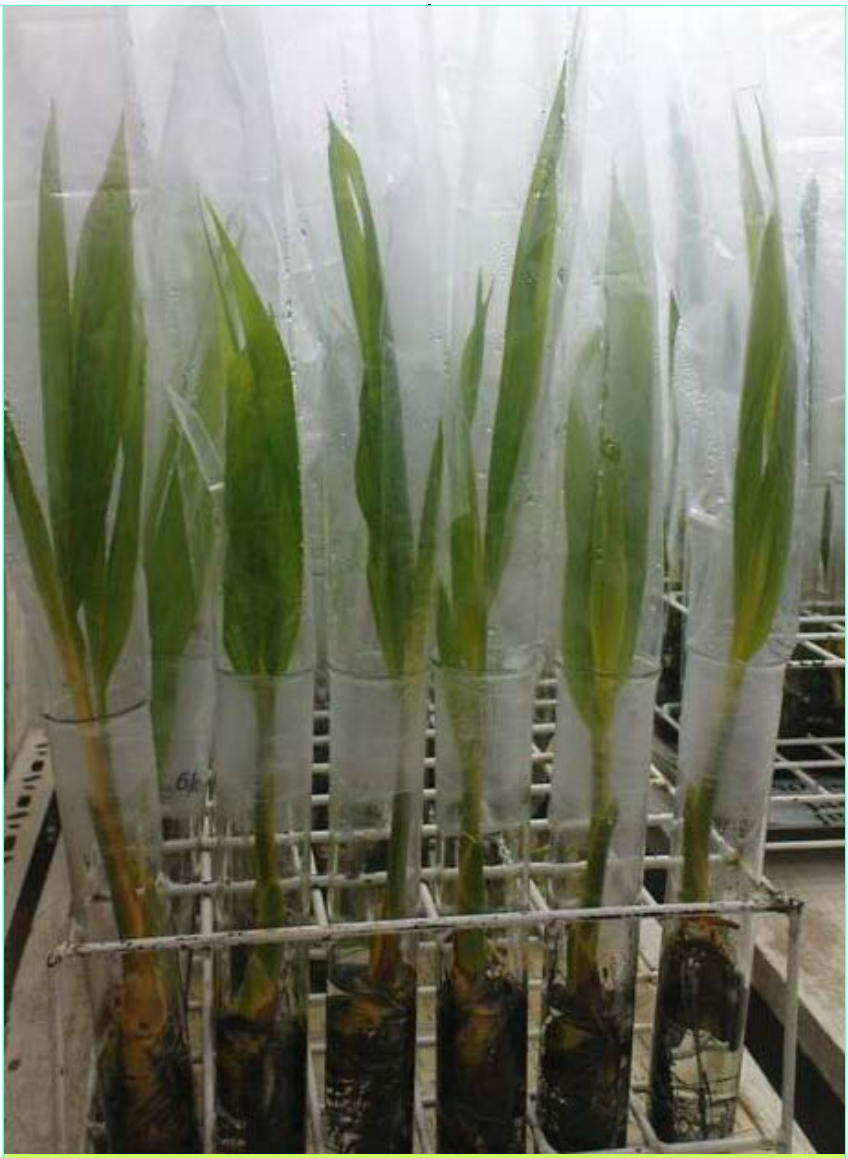
COCONUT GERMPLASM EXCHANGE VIA EMBRYOS: SRI LANKAN EXPERIENCE

L. Perera[1], L.K. Weerakoon[2,3] and W. Widanarachchi[2]

Diverse germplasm of a crop plant is the most basic pre-requisite for a plant breeding because they provide raw material for genetic improvement. A programme for collection and conservation of coconut germplasm has been in place at Coconut Research Institute (CRI) of Sri Lanka since 1980's. With the active involvement of COGENT in 1990, this programme was later accelerated and standard scientific protocols were established for collection, conservation and evaluation of coconut germplasm. CRI in its germplasm programme has so far conserved 152 different accessions comprising of dwarf, tall and intermediate coconut varieties collected by both random and biased sampling techniques. CRI collection of coconut germplasm has been conserved in *ex-situ* gene-banks.

Further collections are done by biased sampling for specific morphological features in local material. The conserved materials are being evaluated by both morphological and molecular means to generate information for the utilization of the conserved material in the breeding programme. The data collected are deposited in the International Coconut Genetic Resources Database (CGRD).

Coconut breeders at CRI had to depend on the available local coconut germplasm for development of new coconut cultivars. The distinct verities of local tall and dwarf as well as a very few early introduction (San Ramon, Cameroon Red dwarf, Brazilian green dwarf) have been successfully used by breeders for developing improved cultivars. The molecular based studies initiated and conducted by CRI, from year 2000 onwards revealed that the genetic base of the Sri Lanka coconut is narrow and thus incorporation of genetic materials from outside the country is necessary for further improvement to the local coconut breeding programme. Further it has also been revealed that the coconut gene pool in South Asia & Africa is different to that of Southeast Asia and the Pacific.



Embryo Plantlets

During the period from 2002 to 2004, coconut embryos from four varieties from India (2002) (Table 01), ten varieties each from PNG (2004) (table 02) and Ivory Coast (2003) (Table 03) were brought to Coconut Research Institute (CRI), Sri Lanka. The nut collection and the embryo extraction and culturing were carried out under

Table 1. Performance of coconut embryos collected from India

Name of the Cultivar	Number of cultures initiated	Number of embryos germinated & (%)	Number of plants transferred to soil & (%)	Number of plants transferred to field & (%)
Andaman Ordinary	175	137 (78.2)	84 (48)	56 (32)
Laccadive Ordinary	191	100 (52)	37 (19.3)	21 (10.9)
Indian West Coast Tall	182	106 (58)	58 (31.8)	40 (21.9)
Banawali Green Round	121	68 (56)	35 (28.9)	11 (9)
Total	**669**	**411 (61.4)**	**214 (31.9)**	**128(19.1)**

(Average % of embryos germinated is 61.4, Average % of embryos transferred to soil is 19.1)

the personal supervision of a plant breeder and a tissue culturist who visited those countries. Cultured embryos were then hand carried by them back to CRI laboratory. These embryos were cultured in sterile water in small glass vials from the day the embryos were excised in the respective countries and were kept in the same cultures until they reached CRI. Water was used as the storage medium during transport as the risk of contamination is minimal in sterilized water.

The maximum period the embryos were in storage medium (sterilized water) until they place in standard growth medium was about 10 days and this is correct for the first batch of embryos collected from one variety. As collection proceeded, the last batch of embryos collected from another variety stay in the storage medium only about 2-3 days. After bringing them to the Tissue Culture Laboratory at CRI, they were transferred to the standard growth medium (Eeuwens Y3 medium) and maintained under *in vitro* conditions. Once they developed in to complete plants they were transferred to soil and acclimatized under appropriate conditions. Some of these plants have already been established in the field and they will be used for future breeding programs. However, the overall success of the germplasm exchange program including shoot tip culture was 10% which was not very pleasing.

Sri Lankan Scientist Culturing Embryos in Madang Research Station

Table 2. Performance of coconut embryos collected from PNG

Name of the Cultivar	Number of cultures initiated	Number of embryos germinated & (%)	Number of plants transferred to soil & (%)	Number of plants transferred to field & (%)
Kar Kar Tall	235	49 (20.8)	30 (12.7)	16 (6.8)
Markham Valley Tall	267	31(11.6)	30 (12.7)	23(8.6)
Renell Tall	192	41(21.3)	27 (14.2)	25 (13)
Gazell Peninsula Tall	200	33 (16.5)	15 (7.5)	12 (6)
Thalasia Semi Tall	178	05 (2.8)	01	0
PNG Brown Dwarf	193	46 (23.8)	19 (9.8)	08 (4.1)
PNG Yellow Dwarf	159	29 (18.2)	05 (3.1)	0
Malayan Yellow Dwarf	193	39 (20.2)	16 (8.2)	12 (6.2)
Malayan Red Dwarf	168	03 (1.7)	04 (2.3)	04 (2.3)
Niaz Yellow Dwarf	185	22 (11.8)	07 (3.7)	03 (1.62)
Total	**1970**	**298(15.1)**	**154 (7.8)**	**103 (5.2)**

(Average % of embryos germinated is 15.1, Average % of embryos transferred to soil is 7.8)

One of the main reasons for this was very poor germination and development of embryos which was accounted for 68% for Indian (Indo Atlantic origin) materials, 92.2% for Pacific origin materials from PNG gene bank and 96.2% for Southeast Asian and Pacific origin materials from Ivory Coast gene bank.

Table 3. Performance of coconut embryos collected from Ivory Coast

Name of the Cultivar	Number of cultures initiated	Number of embryos germinated	Number of shoot tip cultures established	Number of plants transferred to soil	Number of plants transferred to field & (%)
Polynesia Tall	214	01	156	02 (0.9)	0
Tagnanan Tall	212	09	179	40 (18.8)	21(9.9)
Vanuatu Tall	236	09	138	23 (9.7)	11 (4.6)
Tacunan Green Dwarf	40	05	27	08 (20)	01 (2.5)
Tahitian Tall	263	01	190	18 (6.8)	05 (1.9)
New Lekha Green Dwarf	280	02	225	24 (8.6)	08 (2.8)
Tenga Tall	61	15	37	27 (44)	16 (26)
Malayan Red Dwarf	178	01	115	06 (3.4)	04 (2.2)
West African Tall	236	10	193	32 (13.5)	09 (3.8)
Catigan Green Dwarf	90	17	55	28 (31)	12 (13)
Total	**1810**	**70 (3.8)**			

(Average % of embryos germinated 3.8)

The prolonged period of storage in sterilized water might have contributed to poor embryo germination, but a distinct genotypic effect was also observed as in certain varieties very few embryos were observed to be germinated in culture while some other varieties showed satisfactory rate of germination, despite the storage period in water. The Indian varieties (indo Atlantic origin) generally showed a satisfactory germination and it may be that they were storage for less time period than those from PNG and Ivory Coast. There is again another hypothesis that Sri Lanka and India coconut germplasm has the common South Asia origin and therefore Indian varieties respond well to the protocol developed for Sri Lankan materials which has the same origin. The PNG and Ivory Coast materials were of Southeast Asian/Pacific origin and DNA analysis has proved that these two groups are highly genetically different.

In order to enhance germination, Gibberellic acid (GA_3) was applied and only a few embryos could be recovered by this. Even after germination, many embryos did not grow well in culture and these did not develop in to complete plants that could be transferred to soil. Intense browning and premature senescence of embryos was observed in some cultures. Even some of the well developed plants could not be rescued as a result of quick browning of leaves. Out of the plants transferred to soil, some were very weak and thus they did not survive during acclimatization.

In the case of PNG material, the

Germplasm Expedition in PNG

non-germinated embryos were sub-cultured several times in GA_3 containing media (both solid and liquid Y3 media) to induce germination. Since most of the embryos did not respond to this treatment, the shoot tips were excised and cultured in solid Y3 medium (in the case of fairly enlarged embryos, a sizable portion of the embryo was excised that contained both shoot and root poles), as a last resort. This was the first report such an attempt was made *in vitro*-cultured embryos.

However, there were many embryos that did not show any growth (no enlargement) and with these embryos, it was not possible to excise the shoot tips and they had to be discarded. However, the growth of the shoot tip cultures was very poor. One reason for this may be that the excision of shoot tips were done at a very late stage (after several subcultures) and thus the material was not fresh. However, some shoot tips developed well and gave rise to complete plants.

Even in the case of Ivory Coast material, germination was very poor. Thus excision of shoot tips was done at an early stage and some of these cultures showed good growth. However, there were many embryos that did not enlarge and attempts were made to dissect the plumules of these embryos under a stereo microscope. However, none of these plumules showed any sign of growth in the embryo culture medium. The excised plumules were transferred to callus induction medium as an attempt to obtain callus but the attempt was not successful.

These observations were made available to the COGENT. As a result, an internationally collaborated project on "Validation of coconut embryo culture protocol for international exchange of germplasm" was formulated by COGENT with funding from Global Crop Diversity Trust and supported by Bioversity International. The project was implemented via four laboratories, Ivory Coast (CNRACI), Papua New Guinea (CCIPNG), the Philippines (PCAZRC) and Sri Lanka (CRISL).

The Project aimed to optimize, validate and apply an existing standard protocol for selecting, culturing and transferring coconut embryos for wide application taking into consideration the variety effect and culture conditions. Under their objectives, optimizing the embryo culture protocol through the transfer of embryos from the Ivory Coast to the Philippines, Papua New Guinea (PNG) and Sri Lanka and assessing the feasibility of shipping embryos as compared to hand-carrying embryos had direct relevance with the limitations and constrained out lined by the report of Sri Lanka germplasm exchange programme.

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2) *Tissue Culture Division, Coconut Research Institute, Lunuwila, Sri Lanka*
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An Interview with Mr. Louis Djoko, General Manager, Crest International Industrial Development Indonesia Ltd. by Uron N. Salum

PT. Crest International Industrial Development Indonesia is located in South Lampung Regency, South Sumatra Province, Indonesia. South Lampung Regency is one of coconut producing regencies. This company is successful in developing various non-edible coconut products such as coir fiber, coconut shell charcoal, and coconut shell charcoal based activated carbon. Mr.Uron N. Salum, the Editor-in-Chief of COCOINFO INTERNATIONAL, has had an opportunity to interview Mr. Louis Djoko, General Manager of the company, below is the excerpt of the interview.

Cocoinfo International (CI): Mr. Djoko, why did you choose South Lampung as the basis of your production site?

We The reason for choosing South Lampung Regency as my production site is because it provides abundant raw materials for my company. In Kalianda Sub-district where my factory is located, for example, we can find many coconut plantations which will guarantee the availability of raw materials of my factory such as coconut husk and coconut shell charcoal. Likewise, South Lampung has such good infrastructure as inter-provincial roads, electricity and exporting port. So South Lampung is a strategic location for my factory.

(CI): Could you brief us how you become interested in coconut processing ventures?

Initially, a foreign buyer came to my office and asked if I could supply him with coconut fiber. After receiving such request, I conducted a kind of feasibility study and found that abundant of coconut husk in South Lampung Regency was left unprocessed and became a waste in this regency. Most coconut farmers tried to get rid of the waste by burning the coconut husk. Therefore, they are happy when I told them that I would buy their coconut husk. Then, I informed the foreign buyer that I could supply him with coconut fiber provided he supplied a decorticating machine. The foreign buyer agreed to supply the decorticating machine and we set up a joint venture company for processing non-edible coconut products in 2006. The company has been running well up to now.

Mr. Uron N. Salum (left) having discussion with Mr. Djoko (right) on the way to the coir processing site

(CI): Are coconut shell charcoal and coconut husk as raw materials of your processing company easily obtained? If you have experienced any difficulties in sourcing these raw materials, what would be the main cause?

During the production year of 2007-2010, raw materials were really abundant and easily obtained. Recently raw materials are getting less due to lower coconut production and productivity which may be caused by growing senile of

Shieving Coir Fiber

coconut trees. This indicates that more replanting programs are needed.

(CI): Do you deal directly with coconut farmers or through traders and / or collectors in sourcing raw materials?
To source coconut husk, we deal with coconut farmers directly. For coconut shell charcoal we deal with both coconut farmers and traders/ collectors.

(CI): What kind of coconut fiber products is produced by your company?

We only produce raw coconut fiber which will be used for other industrial products.

(CI): Do you market your coco fiber products domestically or do you export them to overseas buyers?

We do not sell our coconut fiber in domestic market, all raw coconut fiber from my factory goes to export market.

(CI) Your company also processes coconut shell activated carbon, could you brief us the process of coconut shell charcoal activation?

That's right, our company is also producing coconut shell charcoal based-activated carbon. The technology used for producing this product is called 'steam injection'. The production process begins with burning coconut shell charcoal with the temperature ranging from 800-900 °C, followed by activation process by steam injection.

(CI): Is the machinery for both coconut shell activated carbon processing and coconut fiber processing produced locally of imported?

As previously mentioned, coconut fiber processing mechinery was initially imported (through our foreign buyer) but now it can be produced locally. However machinery for coconut shell charcoal based- activated carbon processing is still imported.

(CI): What is your current production capacity? Does the production capacity match with the factory installed capacity?

The production capacity of coconut fiber is 200 Metric Ton per month, and the production capacity of coconut shell charcoal based-activated carbon is also 200 Metric Ton per month. These production capacities are in line with the

Coir Fiber in Bales

Shieving Coconut Shell Charcoal

installed capacity of our factory.

(CI): How many people are involved in production process? Are they permanent or seasonal workers?

Currently there are 30 people working in coconut fiber processing in which 10 people are permanent workers, and the remaining 20 people are seasonal workers. A total of 12 people are working in coconut shell charcoal based-activated carbon in which half of them are permanent workers and another half are seasonal workers.

Coconut Shell Charcoal is being Activated

(CI): Quality control is very important for product sustainability. How do you maintain the quality of your products?

For coconut coconut fiber quality control we rely on visual analysis. For coconut shell charcoal activated quality control is done by our laboratory based on buyer's specification. We can produce coconut shell charcoal based-activated carbon with iodine value ranging from 800 to 1200.

(CI): What is your opinion about developing the coconut sector to it more sustainable and viable in South Lampung particularly and Indonesia in general?

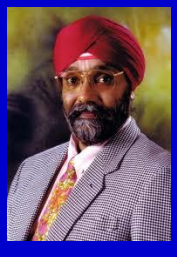
Coconut Shell Based-Activated Carbon in a Plastic Sack Ready for Export

Indonesian coconut industry can be further developed to produce other quality coconut products such as Virgin Coconut Oil, Nata de Coco, and Coco peat for planting materials

(CI): Thank you very much Mr. Rajiv Singh & Ms. EO for sharing about your coconut business venture with your valued readers. We wish you well in your coconut business venture and that you become more productive and profitable in years to come.

My pleasure Mr.Uron N. Salum.

EXPERTS' FINDINGS ON THE HEALTH BENEFITS OF COCONUT WATER



Prof. Rabindarjeet Singh
Director, Sport Science Unit, University Science Malaysia

A study on the effectiveness of fresh young coconut water (Malayan Tall Coconut Variety) for whole body rehydration, following exercise-induced dehydration shows that although plasma glucose was high when coconut water was ingested, it was significantly higher with CEB (Carbohydrate-Electrolyte Beverage) due to its higher glucose content. With coconut water having similar rehydration index with same trend for per cent rehydration and restoration of plasma volume with the CEB, it can be concluded that coconut water could be used for whole body rehydration after exercise-induced dehydration. In addition, consumption of coconut water caused less nausea, fullness and no stomach upset and it is also easier to consume larger amount of coconut water when compared with carbohydrate-electrolyte beverage or a sports drink.

(Source: Prof. Rabindarjeet Singh, 2009. Coconut Water: A Rehydrating Drink after Exercise *Cocoinfo International*, 16 (1): 19-20, and in Proceedings, Malaysia National Coconut Conference 2009, Perak, Malaysia)

DR. D.P. Athukorale

Cardiologist, Pharmacologist, Academician, Colombo, Sri Lanka

Green Coconut has much water and is rich in proteins, minerals, vitamins, calcium, phosphores, iron, iodine, chlorine, sulphur, potassium, carbohydrates and vitamins, B1, B2, B5 and magnesium. The water also helps the hydration of the body. The green coconut has a ratio of amino acids arginine, alanine, cisteína (essential) and serina, greater than those found in cow's milk. It is perfect and natural isotonic to restitute energies in the human body.

Tender coconut water has been used in other areas of the world where intravenous solutions cannot be obtained. Japanese have used tender coconut water (T.C.W.) intravenously in Sumatra, Indonesia in World War I. Pradera et. al. have used intravenous T.C.W. for pediatric patients in Havana, Cuba without any serious reactions

(Source: Dr. D.P. Athukorale 2008. Tender Coconut Water – Its Health Benefits *Cocoinfo International*, 15 July: 14-16)

Dr. Bruce Fife

Certified Nutritionist and Doctor of Naturopathic Medicine, USA

One of the secrets to coconut water's success as a rehydration fluid is its mineral or electrolyte content. Coconut water contains the same major electrolytes as those in human body fluids. It has proven to be a superior rehydration fluid when taken both intravenously and orally.

Today coconut water is used worldwide as a home treatment for dehydration-related diseases such as cholera and influenza. Death rates from cholera are high. Death, however, is not caused by the infection itself, but by dehydration resulting from the loss of body fluids. Giving cholera patients adequate amounts of coconut water results in a remarkable 97 percent recovery rate.

(Source: Fife, Bruce *Healthy Ways Newsletter, Vol. 4 No.4)*

Dr. (Mrs.) E.R.H.S.S. Ediriweera

Senior Lecturer, Department of Nidana Chikithsa, Institute of Indegenous Medicine, University of Colombo, Rajagiriya, Sri Lanka

- Young coconut water could be drunk to alleviate the burning sensation during micturition
- Young coconut water, breast milk, treacle of *Saccharum officinarum* (F.Graminae) and sugar are mixed together and given for hiccough
- Leaves of *Dregia volubilis* (F. Asclepiadaceae) are to be pounded and mixed with tender nut water. The juice is extracted and given in treatment of poisoning of *Nerium indicum* (F. Apocyanaceae)
- Water of young king coconut (before flesh is formed inside) is given for fever and it can be consumed as a diuretic in dysuria.
- A King coconut is to be opened by slicing off the top.30 gms of powdered fruits (without seeds), of *Terminalia chebula* (F.Combretaceae) are added to the King coconut water inside and stirred. Sliced top is then replaced (as a cover) and kept outdoors in the dew overnight. Following morning, the mixture inside is to be filtered and drunk as a purgative. This is called El Vireka by Sri Lankan traditional physicians. The number of bowel motions will increase as the person continues to drink cold water from time to time during the morning. He should not consume hot or warm food and liquids. This is good for purifying blood and cooling the body.

Vermen M. Verallo-Rowel, M.D.
Award-winning, American Fellow Dermatologist and Medical Researcher based at the Makati Medical Center, Metro Manila, Philippines

- Coconut water contains growth factors that function much like a culture broth and that get used up in the process of growth of the meat.
- Whether in human beings or in plants, growth factors are produced to regulate growth. These chemicals are very potent. Even tiny amounts produce major growth effects. These plant growth factors have bewitching, Merlin-the-Magician-like names: *gibberelin, auxin*, and *cytokinin*. Each promote growth.
- One of most studied of the *cytokinins* is *kinetin* which is also found especially abundant in coconut water.
- Because of its size, the growth factors in the coconut are abundant compared to other nuts in plant kingdom. They are kept in a stable environment (the coconut itself), continue to be active, and withstand the rigors of heat and storage – perhaps because throughout its life the coconut is exposed to the sun and the elements at 30 meters or more above the ground.
- Kinetin, one of the coconut's growth factors, has been shown to retard the aging of fruit flies and of human cells in culture, and finally, of people using a cream containing kinetin.

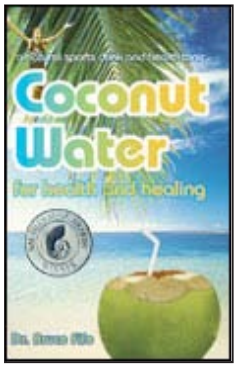
(Source: Verallo-Rowell, V.M. 2005. *RX: Coconuts! (The Perfect Health Nut). Bookman, Inc, Manila, Philippines)*

Dr. Eufemio Macalalag
Director of Urology, the Chinese General Hospital, Metro Manila, Philippines

- Dr. Macalalag has proven the effectivity of administering coconut water in treating renal disorders and in reducing or dissolving all kinds of kidney stones. The process involved the endoscopic procedure of multiple urethral stenting (MUS) or tubatuin (MUS-T), inserting two to twelve urethral catheters into the kidney ureter and irrigating it with coconut water from seven to nine-month old coconuts or buko nectar concentrate powder (BNCP) for a period of 3-19 days. Daily "bukolysis" and renoclysis with BNCP efffects approximately 10 percent reduction in the size of all types of stones treated.
- Dr. Macalalag said that the water from one mature coconut consumed daily, which is equivalent to about two full glasses per nut, could almost guarantee that the formation of stones in the urinary tract would be prevented. Dr. Macalalag asserted that the biggest plus factor in "bukolysis" is its capacity to dissolve kidney stones and arrest their growth.

(Source: *http://www.pinoybisnes.com/food-business/coconut-water-an-economical-health-drink/*)

Coconut Water for Health and Healing



This book describes the many health benefits of this remarkable beverage. It includes a fascinating account of how coconut water has been used as an emergency IV fluid around the world and why it is becoming one of the most popular sports rehydration drinks today.

Coconut water isn't just for rehydration, however. Studies show it provides numerous health benefits, some of which are the following: dissolving kidney stones, protecting against cancer, balancing blood sugar, providing ionic trace minerals, improving digestion, feeding friendly gut bacteria, relieving constipation, reducing risk of heat disease, improving blood circulation, lowering high blood pressure, helping prevent atherosclerosis, possessing anti-aging properties, and enhancing immune function.

Coconut water tastes delicious straight from the coconut, but can also serve as the base for a variety of foods and beverages. Included are 36 tantalizing coconut water recipes. With 80 percent less sugar than fruit juice or soda, coconut water makes a healthy, refreshing drink for you and your kids.

EXPERTS' FINDINGS ON THE HEALTH BENEFITS OF COCONUT OIL

Marry G. Enig, Ph.D.
Director, Nutritional Sciences Division, Enig Associates, Inc.12501 Prosperity Drive, Suite 340, Silver Spring, MD, 20904-1689 USA

The lauric acid in coconut oil is used by the body to make the same disease-fighting fatty acid derivative monolaurin that babies make from the lauric acid they get from their mothers' milk. The monoglyceride monolaurin is the substance that keeps infants from getting viral or bacterial or protozoal infections. Until just recently, this important benefit has been largely overlooked by the medical and nutritional community.

(Source: Enig, G.M. 2001. *Health and Nutritional Benefits from Coconut Oil: an Important Functional Food for the 21st Century*. Coconuts Today, Special Edition for the 13th Asian Pacific Congress of Cardiology, October 2-3, 2001, EDSA Shangrila Hotel, Manila, Philippines).

Vermen M. Verallo-Rowel, M.D.
Award-winning, American Fellow Dermatologist and Medical Researcher based in Manila, Philippines

The Coconut is the Perfect Health Nut. The coconut can help you avoid obesity, boost your immunity, protect you from bacteria, fungus, and viruses – all while keeping you heart-healthy and moisturizing your skin to a natural glow and beauty, even treating acne, and providing beneficial antiseptic, tumor-protecting, and antioxidant effects.

Source: Verallo-Rowell, V.M. 2005. *RX: Coconuts! (The Perfect Health Nut). Bookman, Inc, Manila, Philippines..*

Dr. Jon J. Kabara
Emeritus Professor, Michigan State University, and Technology Exchange Inc. Galena, Illinois 61036, U.S.A

Never before in the history of man it is so important to emphasize the value of lauric oils. The medium-chain fats in coconut oil are similar to fats in mother's milk and have similar nutriceutical effects. In the past four decades misinformation and disinformation provided by certain politically biased agricultural groups and repeated in professional and lay press have led people to believe that all saturated fats are unhealthy. Little attention is focused on the fact that saturated fatty acids are not single family of fats but comprise three subgroups: short (C2-C6), medium (C8-C12) and long (C14-C24) chain fatty acids. The medium chain fats are found exclusively in lauric oils.

(Source: Kabara, J.J. 2000. *Nutritional and Health Aspect of Coconut Oil* In: *Proceedings of the XXXVII COCOTECH Meeting/ ICC 200, 24-28 July 2000,* Chennai, India, pp. 101-109) .

Dr. Conrado Dayrit

Emeritus Professor, University of the Philippines, College of Medicine, Former President, National Academy of Science & Technology, Metro Manila, Philippines

With all the opprobrium cast against it, it bears repeating again and again that no evidence has ever been presented to prove that coconut oil causes coronary heart disease in humans. The human epidemiologic evidence proves that coconut oil is safe. Coconut eating peoples like the Polynesians and Filipinos have low cholesterol, on the average, and very low incidence of heart disease. All evidences now point to inflammation and low HDL as the principal instigators of plaque formation. The chemical properties of coconut oil (CNO) and its biologic actions as a medium chain fatty acid make CNO superior to other oils for cooking and health use. Its anti-inflamatory and immune-regulatory actions as shown by its remarkable control of diabetes, hypertension, heart disease, auto-immune diseases and cancer, make coconut oil unique.

Source: Dayrit, Conrado S. 2006. Coconut Products and Virgin Coconut Oil (VCO) for Health and Nutrition – A strategy for Making Coconut Globally Competitive. In *Proceedings of the XLII Cocotech Meeting, 21-25 August 2006, Manila, Philippines*.

Dayrit, Conrado S. 2005. The Truth About Coconut Oil: The Drugstore in a Bottle. Anvil Publishing, Inc. Manila, Philippines.

Dr. Bruce Fife

Certified Nutritionist and Doctor of Naturopathic Medicine, USA

If there was an oil you could use for your daily cooking needs that helped protect you from heart disease, cancer, and other degenerative conditions, improved your digestion, strengthened your immune system, and helped you lose excess weight, would you be interested? This is what coconut oil can do for you. The oil from the coconut is unique in nature and provides many health benefits obtainable from no other source. Coconut oil has been called the healthiest dietary oil on earth. If you are not using coconut oil for your daily cooking and body care needs, you are missing out on one of nature's most amazing health products.

(Source: Fife, B. 2004. *The Coconut Oil Miracle.* Penguin Books (USA.) Inc. New York, USA.)

Walujo Soerjodibroto, MD, Ph.D.

Nutrition Department, Faculty of Medicine, University of Indonesia, Jakarta, Indonesia

The clinical study on the effects of virgin coconut oil (VCO) on immune responses among HIV positive patients in Dhamais Hospital, Jakarta concludes that the macronutrient intake, mostly in terms of energy, fats and protein were significantly improved among the VCO supplemented group. In addition, the weight and nutritional status of the subjects, especially among the VCO supplemented group, were maintained well throughout the study. By maintaining body weight and nutritional status, it is expected to have significant increases in CD 4 concentration because nutritional status is frequently associated with immune status, both humoral and and cell-mediated.

(Source: *Research Report on the Effects of Virgin Coconut Oil on Immune Responses among HIV Positive Patients in Dharmais Hospital, Jakarta, 2006:21*)

DR. D.P. Athukorale
Cardiologist, Pharmacologist, Academician, Colombo, Sri Lanka

Coconut milk and coconut oil are consumed by the majority of Sri Lankans and rural people which comprise 70% of our population. They get a significant portion of their calories from coconut. It has been found that the majority of people in the rural areas get about 35 gram of fat per day from coconut and they consume very little food containing fats such as milk, butter, cheese, beef, pork, and corn oil as they cannot afford these expensive dietary items. From our clinical experience, we know that serum cholesterol level of people in rural areas is very low. When we investigate patients with ischaemic heart disease (IHD) from rural areas, we find that their serum cholesterol is normal or low. The commonest risk factor for heart attack in rural areas is smoking.

Coconut has been used in Sri Lanka for over 1000 years but the epidemic of IHD is of recent origin. Before 1950, heart attacks were not common in Sri Lanka.

(Source: D.P. Athukorale 1996. The Truth About Coconut Oil. In *Facts About Coconut Oil*, Jakarta: APCC, pp. 52-54) .

Raymond Peat Ph.D.

A lecturer at some universities such as the University of Oregon, Urbana College, Montana State University, National College of Naturopathic Medicine, etc.

Most of the images and metaphors relating to coconut oil and cholesterol that circulate in our culture are false and misleading. I offer a counter-image, which is metaphorical, but it is true in that it relates to lipid peroxidation, which is profoundly important in our bodies. After a bottle of safflower oil has been opened a few times, a few drops that get smeared onto the outside of the bottle begin to get very sticky, and hard to wash off. This property is why it is a valued base for paints and varnishes, but this varnish is chemically closely related to the age pigment that forms "liver spots" on the skin, and similar lesions in the brain, heart, blood vessels, lenses of the eyes, etc. The image of "hard, white saturated coconut oil" isn't relevant to the oil's biological action, but the image of "sticky varnish-like easily oxidized unsaturated seed oils" is highly relevant to their toxicity.

(Source: *Coconut Oil by Dr. Raymond Peat, http://www.efn.org/%Eraypeat/coconut.rtf*)

Dr. Mehmet Cengiz Oz
Director of the Cardiovascular Division
New York Presbyterian Hospital

If you're going to choose just one product to add to your health arsenal, coconut oil may be your best bet. Coconut's chemical compounds make this natural ingredient a powerful tool to solve a whole handful of health issues, including aging, weight balance and infection. Full of antioxidants, this healthy fat is an Oz-approved essential for a healthier you.

(Source: www.coconutresearchcenter.org)

Prof. B.M. Hedge
M.D. FRCP (London) FRCP (Edinburg), FRCP (Glasgow), FRCPI (Dublin) FACC, FAMS

Little over 50 per cent of coconut oil is medium chain fatty acid, Lauric acid and another 7-10 per cent is medium chain Capric acid. Lauric acid gets converted inside the human system into Monolaurins, the best fat that mother's milk has. Other than mother's milk monolaurins are found only in coconut oil. New born babies and infants depend on the monolaurins for their immune system development and their capacity to withstand any infection. In addition, coconut oil can be digested by the salivary lipase, getting obsorbed very fast to give energy like carbohydrates. All other fats need the pancreatic lipase for digestion that the infants do not have. The coconut oil is the best alternative food fat for the infant when mother's milk is not available.

Coconut oil is low calorie fat and as such helps control body weight. Changing the food fat to coconut oil could help reduce weight in obese individuals. It also helps to control blood fat levels in diabetics. Coconut oil's regular use in diet would regularize blood fats and is known to increase the HDL cholesterol fraction while decreasing the LDL and triglycerides significantly; disproving the myth that coconut oil increases cholesterol and triglycerides.

(Source: "Coconut Oil-Ideal Fat Next Only to Mother's Milk" in www.bmhegde.com)

Naiphinich Kotchabhakdi, Ph.D.
Neuroscience, Research Center, Institute of Molecurlar Bioscience, Mahidol University, Salaya, Nakornpathom 73170, Thailand

Coconut oil is a rich natural source of Medium-Chain Fatty Acids (MCFAs) which contain highest percentage (up to 92%) of saturated fatty acids with 6-12 carbons, such as Caproic or Hexanoic acid (C6:0), Caprylic or Octanoic acid (C8:0), Capric or Decanoic acid (C10:0) and Lauric or Dodecanoic acid (C12:0). These MCFAs usually form esters of glycerol to become Medium-Chain Tryglycerides (MCTs). Like all triglycerides (fats and oils), MCTs are composed of a glycerol backbone and three fatty acids. In the case of MCTs, 2 or 3 of the fatty acid chains attached to glycerol are medium-chain in length. Many recent studies have demonstrated that MCTs can potentially help in the process of burning excess calorie, and thus reducing weight gain and promoting loss. MCTs also promote fat β-oxidation and reduced the need for more food intake. Compared with long-chain fatty acids (LCFAs), MCFAs are substantially different in their chemical and physical properties on metabolism. MCFAs do not seem to require binding to proteins such as fatty-acid binding protein, fatty acid transport protein, and/or fatty acid translocase (FAT, homolog to human CD36). MCFAs are a more preferred source of healthy energy (β-oxidation). Recent studies have shown that MCFAs are usually incorporated into adipose tissue triglycerides, and can influence adipose tissue and other systemic functions more substantially than previously known.

(*Source: The International Conference on Coconut Oil 17-20 March 2015, Bitec Conference and Exhibition Center, Samut Prakan, Thailand*)

DR. S.M. Sadikot
Hon. Endocrinologist, Jaslok Hospital & Research Center, Bombay. Hon. Diabetologist, All India Institute of Diabetes, Bombay

Ghee, coconut oil and mustard oil are traditional cooking media which have been used in India and other developing countries for thousands of years. Although they are saturated fats, they do not show a wide Omega-6 to Omega-3 fatty acid ratio which is quite high in polyunsaturated oils. The desirable ratio is less than 10:1. Increasing prevalence of diabetes and other related diseases are found correlated with increasing Omega-6 to Omega-3 ratio. On the other hand, consumption of coconut oil which is deficient in polyunsaturated fatty acids has been found to enhance secretion of insulin and utilization of blood glucose. It is beneficial to consume the traditional edible fats such as coconut oil along with polyunsaturated fats to reduce the Omega-6 intake and maintain optimum Omega-6 to Omega-3 ratio in the diet.

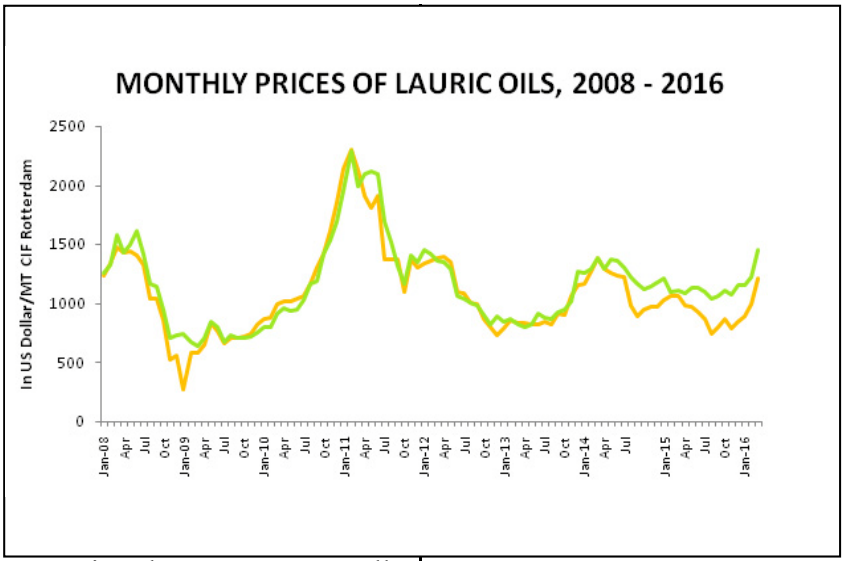
(*Source: Coconut Oil for Health and Nutrition, APCC 2004)*

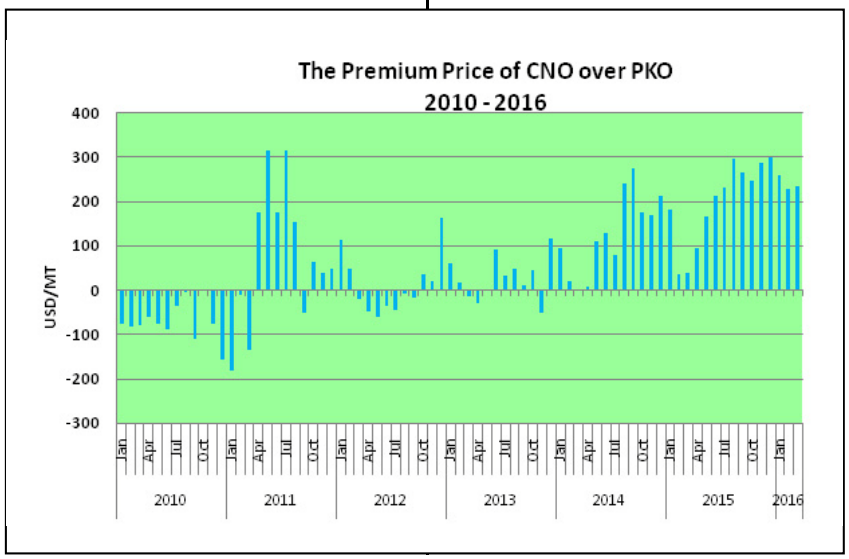
BULLISH COCONUT OIL MARKET IN THE FIRST HALF OF 2016

Alit Pirmansah

The coconut oil market in the first half of 2016 is expected to strengthen after a bearish market in 2015. An expected low copra production in main producing countries such as Philippines and Indonesia has driven coconut oil prices to increase. Price of coconut oil in December 2015 was US$/MT 1,150 in Rotterdam and increased by 38% to US$/MT 1,590 in April 2016. In international market, coconut oil (CNO) plays a complementary role with palm kernel oil (PKO). Thus, the increase in price of CNO has inevitably brought the price of PKO to move up and vice versa.

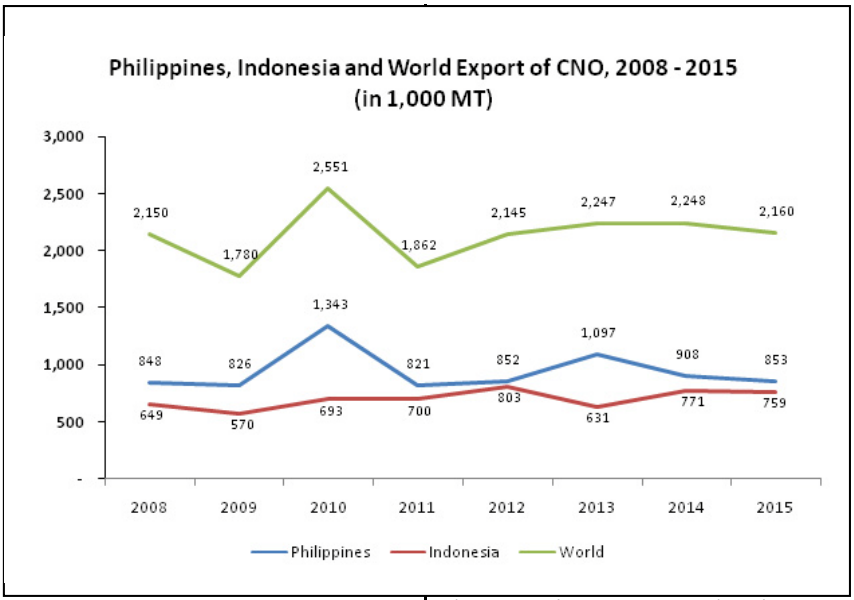
Since the price of CNO increased, it has pulled upward palm kernel oil (PKO) prices. Price of PKO in December 2015 was US$/MT 832 and increased to US$/MT 1,307 in April 2016 or improved by 57%. The significant increase in price of PKO has been narrowing the current unusually large price discount of PKO vis-à-vis CNO. The premium over palm kernel oil in December 2015 was US$/MT 300 and narrowed to US$/MT 283 in April 2016. It is expected that though the market witnesses a bullish trend in the first quarter until second quarter of 2016, the price of CNO would gradually ease. The high premium price over PKO would restrain an increasing trend of CNO price.





The production of coconut oil would be expected to be lower following a shortage of copra supply and coconut production. Copra production in the Philippines, the top coconut oil producer, in 2016 is predicted continue to decline by 9% compared to the previous year following the decrease in production of coconut. The shortfall of coconut production in the Philippines is mainly due to severe dryness besides a persistent impact of typhoons and pest attacks. Hence, it seems that coconut production in the Philippines would take a longer period to recover. As for Indonesia, copra production is predicted to decline by 7.1%.

The decrease in copra production in Indonesia is mainly due to a long drought in 2015 which is expected to lower coconut production up to 40%. Apart from the severe dryness, the decline in copra production is also attributed to the competition for raw

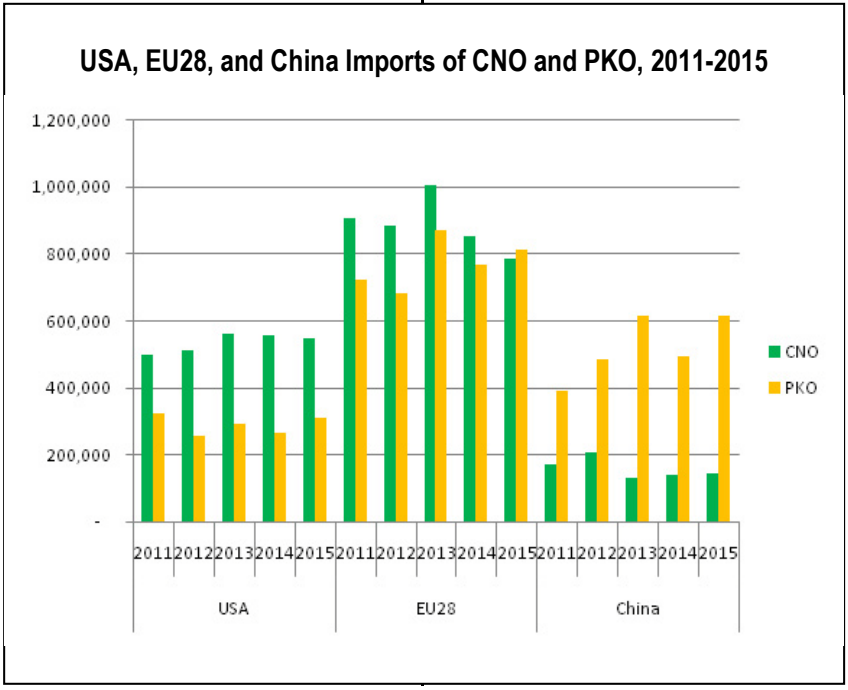


materials with other coconut products such as desiccated coconut and also a sharp increase in exports of fresh coconut. Meanwhile, the reduction of area under coconut, the senility of coconut palms and a slow progress in replanting programs have also contributed to the drop in coconut production. While in India, Coconut Development Board reported that there could be a 5% year-on-year decrease in production of coconut in the country because of deficient rains and pest attacks. While in Sri Lanka, another key producing country, the production of coconut seems to be stagnant for years.

The shortage in the global production has, furthermore, restrained an increasing trend in the global demand. The effect was perceived in the last two years when the world export of coconut oil experienced a year-on-year decrease by 4.9% in 2014 and 1% in 2015 after experiencing a substantial increase in previous two years at an average annual growth rate of 10%. The world exports of coconut oil are expected to remain weak following expected lower copra production. Apart from a shortage in copra production, an unusual price premium over palm kernel oil has been prompting a pronounced shift of demand at the expense of coconut oil at least in some countries.

The Philippines and Indonesia remained two major coconut oil exporters in the world. The countries contributed for more than 80% of global supply in 2015. Exports of coconut oil from the Philippines, as expected, declined in 2015 following the decrease in coconut and copra production. Exports of coconut oil from the Philippines were recorded at 0.853 million tons in 2015 which were 0.4% lower than the previous year. The export, however, seems to remain weak as latest data show a noticeable decrease in the first quarter of 2016. Data from Statistics Philippines Authority shows that from January to March 2016, the export of coconut oil was 150,902 MT or decreased by 40.4% compared the volume of 253,274 MT of January-March 2015. The decrease in shipments of coconut oil from the Philippines in 2016 has been predicted as the Philippines' industry is facing a shortage in raw materials though some companies have been adapting the situation by importing raw material and crude coconut oil from other origins.

Meanwhile, Indonesia, as the second largest exporting country, has also been affected by the shortage of copra production. In addition, the strengthening Rupiah against the USD gave no incentive for exporters of commodities. the official data from BPS-



Statistics Indonesia show exports of coconut oil from Indonesia from January to February 2016 were recorded 116,000 MT which was 7% lower compared to the same period of last year volume.

The decline in global demand of coconut oil was also confirmed by major importing countries. In two major importing countries, US and Europe, imports of coconut oil recorded 5% year-on-year decrease to a multiyear low of 1.34 million MT in 2015. The biggest decrease was registered in Europe (EU28), where imports fell to 0.79 million MT from 0.85 MT in the previous year. In the US, imports of coconut oil slightly decline from 0.56 million MT in 2014 to 0.54 million MT in 2015. In the US and Europe the demand for coconut oil was resistant to huge premiums versus other vegetable oils.

However, Imports of coconut oil by China, as one of major importing countries, showed a year-on-year increase. China's demand for coconut oil increased by 3.8% compared to the previous year's volume. Beside coconut oil, China also boosted palm kernel oil imports by 24% to 0.62 million MT in 2015 bringing imports of the two lauric oils to a record 0.76 million MT in the period.

Alit Pirmansah is Market Development Officer, Asian and Pacific Coconut Community.

International Symposium on Quality Coconut Oil for Nutrition and Health, New Delhi, 28-29 September 2015

Asian and Pacific Coconut Community (APCC) in collaboration with Coconut Development Board (CBD) India organized International Symposium on Quality Coconut Oil for Nutrition and Health on 28-29 September 2015 at Shangrila – Las-Eros Hotel, New Delhi. The objective of the symposium was to review past works carried out globally on coconut oil and virgin coconut oil, identify the research gaps, refining designs for future studies and to explore the future scope on international collaboration / networking with various APCC member countries / institutes. This will lead to formulation of research projects which could be submitted for funding from international donor agencies like WHO, FAO, etc.

The symposium was arranged in four technical Sessions. First and second sessions were set on keynote addresses on the review and status of research work and the clinical studies on coconut oil and virgin coconut oil respectively. The importance and uses of coconut oil in major coconut growing and consuming countries was presented in the third session and the fourth session was set apart for working group discussion.

A display of coconut oil based nutriceuticals, cosmoceutical and toiletery items were displayed to showcase the wide usage of coconut oil and virgin coconut oil in the sectors. This was an eye opener to the participants on the potential of coconut products in the health care segment. The two day-symposium concluded with positive notes and few research studies were listed to be taken up on priority through international collaboration. An international Scientific Advisory Committee was constituted with medical experts from various countries to develop a design common protocol for the collaborative studies and to finalise the areas of studies.

Karnataka CPCs Review Meeting, Chitradurga, India, 19 November 2015.

The third review meeting of the seven Coconut Producer Companies (CPCs) was held at Chitradurga on 19 November 2015. The meeting was chaired by Shri. Ranganath, Chairman, Kalpavrutta Coconut Producer Company and was inaugurated by Dr. T.I. Mathewkutty, Director, Coconut Development Board (CDB), Regional Officer (RO) Bangalore. In his inaugural address Dr. T.I. Mathekutty spoke on launching a 75 days Equity Mobilization campaign to attain maximum participation of all members of CPCs and Coconut Producer Federations (CPFs). He further informed that the draft of G.O. on neera policy is under circulation and same will be issued by the Karnataka Government shortly.

Hence there is an urgent need for training more neera master technicians and he requested each company to identify 20 trainees.

Shri. S. Manjunatha, RO, Coir Board, Bangalore who addressed the participants ensured all assistance for utilizing coir fiber and coir pith from the members of CPCs and CPFs of Karnataka. Shri. Sheshanna, NABARD representative spoke on various assistances available from NABARD for FPOs and Shri. Prasanna Kumar, Senior Assistant Director of Horticulture, Hosadurga, spoke on various schemes available for coconut from State Horticulture Department. Shri. Hemachandra, Deputy Director, CDB reviewed the progress of CPCs and requested the participants to actively participate in the 75 days equity mobilization campaign and to initiate processing activities. Ms. K. Mridula, Technical Officer and Shri. Rupak, Project Manager briefed on the progress of CPCs in Kerala and Ms. Jagadeesh Priya, Food Processing Engineer spoke on the processing of flavored coconut milk and other training programmes of CIT.

CDB participated in India International Trade Fair, 2015, New Dlehi, 14-27 November 2015.

Coconut Development Board (CDB) participated in 35th edition of Indian International Trade fair (IITF) held from 14 to 27 November 2015 at Pragati Maidan, New Delhi.

Shri. Radha Mohan Singh Union Agriculture Minister, Government of India visited the Agriculture Pavillion in IITF on 24 November 2015. The Minister tasted Neera in CDB stall, visited the CDB kiosk and enquired about various coconut value added products.

Participants of Focus Group Discussion on Coconut in Manado, Indonesia

IITF, the largest integrated trade fair of Indian subcontinent with B2Band B2C components, was utilized by the Board as a platform to introduce Neera and various value added products in North Indian market. Coconut products like packed tender coconut water, coconut milk powder, coconut milk, coconut chips, desiccated coconut powder, virgin coconut oil etc. produced by Coconut Producer Companies, Suryashobha, Yogie Foods, and Keratech were exhibited in the Board's pavilion. The theme of the fair was "Make in India". Around 25 lakh people visited the fair. (*Indian Coconut Journal, Vol. 58 No. 7, 2015*)

Focus Group Discussion on Coconut in Manado, Indonesia, 28 April 2016.

Indonesian Palm Crops Research Institute (IPCRI) successfully organized a Focus Group Discussion (FGD) on coconut at Grand Kawanua International City, Manado, Indonesia on 27 April 2016. Resource speakers in this FGD were representatives from IPCRI, Director General of Plantation Crops, Unilever Ltd., and Asian and Pacific Coconut Community (APCC). Head of IPCRI, Dr. Ismail Maskromo, said that the FGD reflects the concern of Indonesian Agency for Agricultural Research and Development (IAARD), Ministry of Agriculture on coconut sector.

He added that current coconut development should render sustainable livelihood and benefits to coconut farmers. In this regard, coconut farmers should use high yielding coconut varieties and coconut processing industries continue to produce high valued coconut products such as desiccated coconut, coconut milk, organic coconut sugar, coconut shell charcoal based-activated carbon, coconut water beverage, and others using a zero waste production system. Coconut rejuvenation program should be immediately implemented with the support of government, private and banking sectors.

Participants of ASEAN Focal Point Working Group on Coconut in Yogyakarta, Indonesia

Meanwhile Andi Nur Alamsjah representing IAARD in his inaugural speech said that Indonesian coconut processing industries now lack of raw materials although Indonesia is one of major coconut producing countries. He expected that this FGD would result in a breakthrough in overcoming this problem which will benefit both coconut industries and coconut farmers. Provincial and Regency governments were involved in this FGD which was also attended by representatives of entrepreneurs, coconut farmers, academicians, and researchers. (*Manado Pos, 28 April 2016*)

Meeting of ASEAN National Focal Point Working Group on Coconut, Yogyakarta, Indonesia, 28-29 April 2016.

APCC participated in the 3rd meeting of the National Focal Point Working Group (NFPWG) of Association of South East Asian Nations (ASEAN) on Coconut. The meeting was hosted by Indonesia and held on 28-29 April 2016 at Hotel Santika, Yogyakarta. Mr. Dwi Promono, Director of Perennial and Beverage Crops, Ministry of Agriculture, Government of Indonesia gave the opening remarks following which Philippines and Indonesia were selected as the Chairperson and Vice Chairperson respectively. Mr. Roel M. Rosales, Deputy Administrator, Philippine Coconut Authority, who represented Philippines chaired the meeting. The meeting was attended by delegates of ASEAN member countries.

A paper on the Market outlook for the coconut industry was presented by Mrs. Deepthi Nair,S., Assistant Director, APCC. Country presentations were made by member countries following which the action taken on the decisions of the previous meetings on the Strategic Plan of Action were discussed. Prof. Dr. Ir. Irawadi Jamaran from Indonesia Coconut Board presented the details of coconut cultivation and processing in Indonesia. The strategic plan was developed, specific to the development of the coconut sector in the ASEAN member countries. A field visit was also conducted on the second day.

Table 1. WORLD Exports of Coconut Oil, 2010– 2015 (In MT)

Country	2010	2011	2012	2013	2014[r]	2015[p]
A. APCC Countries	**2,236,400**	**1,544,776**	**1,847,598**	**1,899,432**	**1,903,011**	**1,832,082**
Fiji	9,700	10,200	3,794	1,494	1,630	1,837
India	3,000	4,251	7,830	6,829	7,067	7,114
Indonesia	692,500	540,050	802,947	630,568	771,419	759,381
Malaysia	131,600	141,963	136,783	131,068	177,225	152,249
Marshall Islands	0	0	3,956	3,330	124	3,000
Papua New Guinea	45,300	54,349	19,847	13,466	11,068	16,728
Philippines	1,342,500	781,411	852,234	1,096,861	907,606	853,153
Samoa	0	0	3,961	1,428	1,452	1,020
Solomon Islands	0	0	172	2,384	2,000	2,000
Sri Lanka	2,300	1,931	2,499	3,821	11,254	22,032
Tonga	1,000	1,000	0	0	7	3
Thailand	800	1,200	366	651	1,960	2,670
Vanuatu	6,900	7,200	10,011	5,691	9,208	6,570
Vietnam	800	1,221	1,841	1,841	991	4,325
B. Other Countries	**314,803**	**317,028**	**297,510**	**347,712**	**345,000**	**327,750**
p: preliminary figure	*r: revised figure*					
TOTAL	**2,551,203**	**1,861,804**	**2,145,108**	**2,247,144**	**2,248,011**	**2,159,832**

Table 2. Prices of Coconut Products And Selected Vegetable Oils, April 2015-March 2016

(US $/MT CIF, Europe)

	2015									2016		
Products	**Apr**	**May**	**Jun**	**July**	**Aug**	**Sept**	**Oct**	**Nov**	**Dec**	**Jan**	**Feb**	**Mar**
Copra	714	748	748	735	689	699	736	716	759	763	813	990
Coconut Oil	1,080	1,133	1,131	1,100	1,037	1,063	1,108	1,073	1,147	1,155	1,216	1,448
Copra Meal[2]	257	249	246	242	217	206	203	210	218	240	243	266
Desic. Coconut	2,747	2,680	2,155	2,079	2,031	1,957	1,968	2,021	2,159	2,099	2,060	2,155
Mattress Fiber[1]	204	163	154	153	154	138	142	153	190	196	199	173
Shell Charcoal[2]	362	361	356	356	353	346	353	355	365	365	365	334
Palm Kernel Oil	985	966	919	869	739	798	860	785	847	894	988	1,213
Palm Oil	662	659	671	635	549	538	583	558	568	566	640	686
Soybean Oil	749	781	793	751	730	727	742	726	761	727	758	761

[1] *FOB, Sri Lanka*
[2] *FOB, Philippines*

Table 3. World Oil Balance 2014-2016 (1,000 Tons)

Oil/Year	Jan/Dec 2014	Jan/Dec 2015	Oct/Sept 2016[F]
Palm Oil			
Opening Stocks	10,790	11,120	12,450
Production	59,740	62,510	61,610
Imports	44,370	47,710	47,130
Exports	44,370	48,260	47,100
Disappear	59,410	60,930	62,730
Ending Stocks	11,120	12,160	11,370
Soybean Oil			
Opening Stocks	4,310	4,290	4,930
Production	45,250	48,810	51,070
Imports	9,860	12,240	13,280
Exports	9,720	12,610	13,330
Disappear	45,410	47,780	50,650
Ending Stocks	4,290	4,950	5,300
Groundnut Oil			
Opening Stocks	380	250	210
Production	3,920	3,690	3,670
Imports	220	270	250
Exports	240	260	260
Disappear	4,020	3,710	3,680
Ending Stocks	250	250	200
Sunflower Oil			
Opening Stocks	2,100	2,380	1,830
Production	16,160	15,110	15,420
Imports	8,250	7,370	8,000
Exports	8,180	7,600	8,030
Disappear	15,940	15,150	15,410
Ending Stocks	2,380	2,110	1,810
Rapeseed Oil			
Opening Stocks	5,040	5,580	5,130
Production	27,000	26,270	25,370
Imports	4,000	4,160	4,120
Exports	3,990	4,200	4,120
Disappear	26,460	26,840	26,040
Ending Stocks	5,580	4,970	4,460
Corn Oil			
Opening Stocks	290	330	320
Production	3,150	3,280	3,330
Imports	720	810	830
Exports	680	840	830
Disappear	3,150	3,250	3,320
Ending Stocks	330	330	320
Palm Kernel Oil			
Opening Stocks	870	970	1,040
Production	6,540	6,850	6,790
Imports	3,160	3,260	3,320
Exports	3,150	3,310	3,310
Disappear	6,450	6,690	6,890
Ending Stocks	970	1,080	950
Coconut Oil			
Opening Stocks	350	360	370
Production	3,020	2,950	2,840
Imports	1,880	1,880	1,810
Exports	1,870	1,930	1,800
Disappear	3,020	2,880	2,870
Ending Stocks	36 0	390	350

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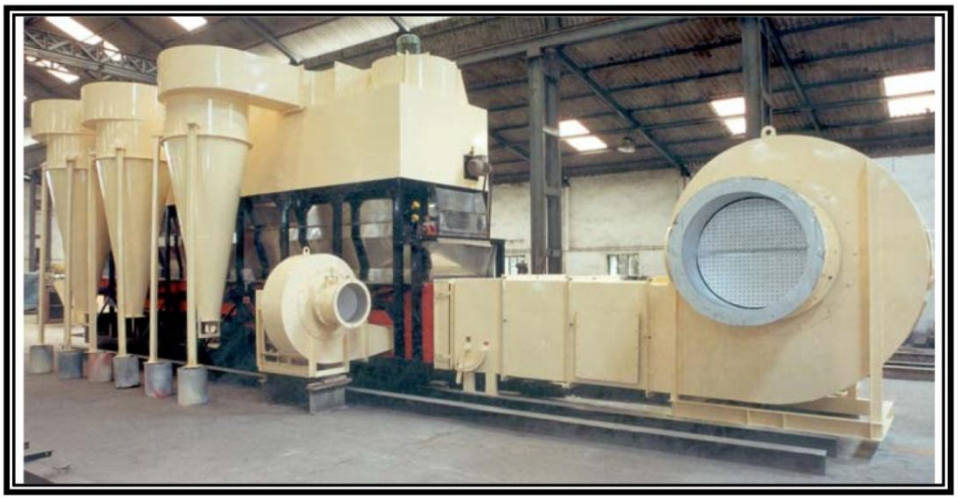

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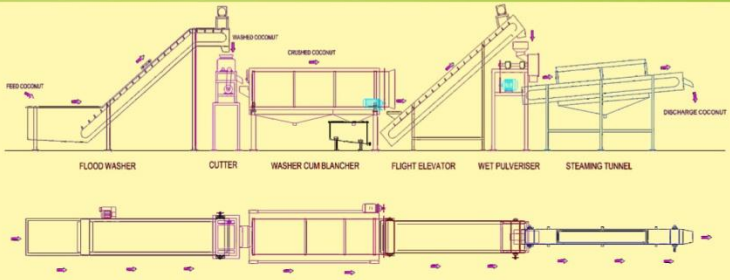

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