The Coconut - a Miracle Palm for Livelihood, Social Security, Wellness and Wealth

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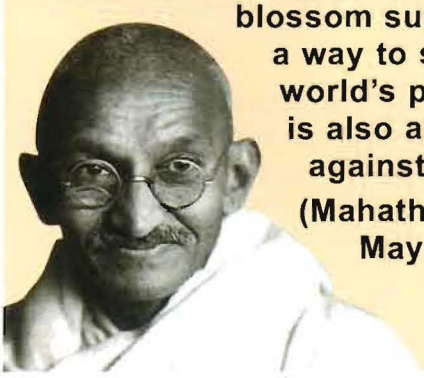
"The juice of the coconut tree can be transformed into a sugar as soft as honey...Nature created this product such that it could not be processed in factories. Palm sugar can only be produced in palm tree habitats. Local population can easily turn the nectar into coconut blossom sugar. It is a way to solve the world's poverty. It is also an antidote against misery."



(Mahathma Gandhi May 03, 1939)

Introduction

The coconut,*Cocos nucifera*,L, God's gifted Tree of Heaven, Kalpavriksha , Tree of Life , Nature's Super Market , culturally, socially and religiously has significance in certain societies, where it features in their mythologies, songs, and oral traditions. It also had ceremonial importance, acquired religious significance right from birth to death of a person in South Asian cultures, where it is used in Hindu rituals. In Sanskrit, it is *kalpavriksha* ("the tree which provides all the necessities of life"). In the Malay language, it is *pokokseribuguna* ("the tree of a thousand uses"). In the Philippines, the coconut is commonly called the "tree of life".

Literary evidence from the Ramayana and Sri Lankan chronicles indicates that the coconut was present in the Indian subcontinent before the 1st century BCE. The earliest direct description is given by Cosmas Indicopleustes in his Topographia Christiana written around 545, referred to as "the great nut of India yes, indeed it is a great saver of human being. It is our responsibility to exploit the potential of coconut for wellness and wealth.

The coconut palm is grown throughout the tropics and one of the most useful tree in the world Virtually every part of the coconut palm can be used by humans in some manner and has significant economic value. Coconut can be used, from cooking to pharmaceutical, nutraceutical and cosmeceuticals as well as in the functional foods and drinks and further as bio fuel and bio lubricant. Nowadays, its flesh (kernel) is processed into different products such as coconut milk and milk powder, desiccated coconut, frozen coconut or use the extracted juice for other foods as coconut candy, coconut jam, puff pastry, rice paper, local dishes etc. Coconut oil from meat is a hair tonic, makes hair stronger, shiny, and help deeply repair signs of existing damage extensively and increases moisture-retaining.

It is also rich in dietary fibre which when absorbed into the body helps abolish bad cholesterol, prevents cardiovascular diseases such as high blood pressure, heart rhythm disorder and respiratory disorder. According to some studies, the healthy fats in copra help the brain curb the risk of progression of Alzheimer's dementia, improve lucidity, sedation, increase concentration, alertness. Coconut oil, a rich source of Lauric oil with its high anti-fungal,

Table 1. Global scenario (2020) of coconut in major producing countries

S No.	Country	Area ("000 "ha)	%Share in Area	Production (Million Nuts)	% Share in Production	Productivity (Nuts /ha)
1	India	2173	17.73	20309	30.93	9346
2	Philippines	3651	29.78	14491	22.07	3969
3	Indonesia	3397	27.71	13994	21.31	4120
4	Sri Lanka	444	3.62	2792	4.25	6288
5	Vietnam	159	1.3	1677	2.55	10547
6	Papua New Guiniea	221	1.8	1483	2.26	6710
7	Thailand	125	1.02	591	0.9	4728
8	Malaysia	85	0.69	561	0.85	6600
9	Kenya	89	0.73	305	0.46	3427
10	Vanautau	90	0.73	303	0.46	3367
11	Fiji	61	0.5	257	0.39	4213
12	Kiribati	31	0.25	145	0.22	4677
13	Jamaica	17	14	121	0.18	7118
14	Soloman Islands	38	0.31	100	0.15	2632
15	Guyana	10	0.08	92	0.14	9200
16	FS Micronesia	18	0.15	60	0.09	3333
17	Samoa	20	0.16	53	0.08	2650
18	Tonga	24	0.2	53	0.08	2208
19	Timor Leste	12	0.1	26	0.04	2167
20	Marshal Islans	7	0.06	18	0.03	2571
21	Other Countries	1586	12.94	8240	12.55	5195
	World	12258	100	65671	100	5357
	Source: International Community Strategical Year Book 2020					

Table 2 Area, production and productivity of coconut- Global & ICC Countries

World ICC Countries	2015	2016	2017	2018	2019	2020
Area ("000 ha")						
World	12,200	12,447	12,284	12,223	12,276	12,258
ICC Countries	10,578	10,812	10,657	10,567	10,653	10,672
Production of whole nuts ("000" nuts)						
World	66,758	67,534	68,255	69,325	67,308	65,671
ICC Countries	58,382	59,266	60,368	61,100	59,158	57,431
Productivity (whole nuts ha-)						
World	5,472	5,426	5,556	5,672	5,483	5,357
ICC Countries	5,519	5,482	5,665	5,782	5,553	5,381
Production of coconuts in copra equivalent ("000"Mi)						
World	11,425	11,475	11,746	12,388	12,033	11,757
ICC Countries	9,748	9,823	10,171	10,743	10,405	10,112
Production of copra ("000"Mi)						
World	4,930	4,757	4,873	5,511	5,642	5,056
ICC Countries	4,682	4,616	4,732	5,367	5,514	4,916

Source : Coconut Statistical Year Book (2020) International coconut community Jakarta

antimicrobial, anti-bacterial and anti-protozoa properties has many health benefits including against HIV /AIDS virus.The flavour of coconut water is a delicious combination of salt and sweet, favourite beverage and will emerge as the world's largely consumed favourite health drink surpassing all other synthetic drinks now available in the market.Coconut water is a delicious, electrolyte-filled, natural beverage that may benefit heart, moderate blood sugar, help improve kidney health, and keep refreshed and hydrated after a workout. Coconut water was reportedly given intravenously to people during World War II when regular IV saline solution was in short supply.

2. Global Coconut

Coconuts have a nearly cosmopolitan distribution grown in more than 93 countries providing livelihood, social, nutritional, health and wellness security and is also eco-friendly.

The Philippines, Indonesia and India are the major leaders in coconut cultivation. India ranks the first position with regard to total production and its productivity is more than double compared to other two major coconut growing countries (Table 1).

The global coconut area was 5.23 million ha during 1961 and it increased to 12.30 million ha in 2020 (Table 1 and 2). The area , production and productivity of coconut in India from 1950-51 to 2019-20 is given in table 3..However, the area expansion since the beginning of 21st century is stagnant and the horizontal area expansion has limited scope due to conversion of arable land to various non-agricultural purposes. Productivity increase is a must and that is very much possible. There is also great possibility for integration of other crops through vertical use of space for inter /mixed / multiple / high density multispecies cropping system and farming system. Global as well as Indian coconut industry should aim at more nuts per palm and more return from nut.

The progressive growth of Indian coconut area, production and productivity of coconut is given in Table 3.

Table 3. Area, Production and Productivity of Coconut in India

Year	Area ('000 ha)	Production (Million nuts)	Productivity (Nuts per ha)
1950-51	626.5	3281.7	5238
1960-61	717.4	4639.1	6466
1970-71	1045.5	6075.0	5811
1990-91	1513.9	9700.2	6407
2000-2001	1823.91	12678.4	6951
2010-2011	1895.90	16942.92	8937
2015-2016	2088.47	22167.45	10,614
2016-2017	2082.11	23904.10	11.481
2017-2018	2096.72	23798.23	11.350
2018-2019	2150.89	21288.24	9897
2019-2020	2,173.28	20,308.70	9,345

3.Coconut and Coconut Products have Bright Future Market

Market studies carried out by various agencies had shown that there is bright future for coconut and its products as detailed below :

The global coconut water market size was valued at USD 4.27 billion in 2019 and is expected to expand at a compound annual growth rate (CAGR) of 16.1% from 2020 to 2027. The global virgin coconut oil market is projected to grow from USD 2.24 billion in 2021 to USD 3.69 billion in 2028 at a CAGR of 7.35% in forecast period, 2021-2028. The global coconut sugar market size was valued at USD 243.4 million in 2021 and is projected to reach USD 408.7 million by 2031, growing at a CAGR of 5.5% for the forecast period. The global desiccated coconut market is estimated to be valued at USD 8.2 billion in 2022 and is projected to reach USD 13.7 billion by 2032. The coconut oil market size was valued at USD 3,440.0 million in 2020 and is estimated to reach USD 7,390.2 million by 2030, registering a CAGR of 5.1%.

The global coconut market was valued at USD 64.95 billion in 2020 and is expected to grow at a CAGR of 5.8% over the forecast period of 2021 to 2028.

The global coconut products market size is valued at USD 105.84 billion by 2025 and is expected to grow at a compound annual growth rate (CAGR).

The global coconut milk market size was USD 184.9 million and it is expected to reach USD 497.9 million by the end of 2027, with a CAGR of 17.0% during 2021-2027. The global coco coir market size is valued at USD 370.0 million in 2022 and is anticipated to increase at USD 525.0 million by 2028, with a growing CAGR of 8.20% in the forecast period. The global activated carbon market size is estimated to be USD 5.7 billion in 2021 and is expected to reach USD 8.9 billion by 2026, at a CAGR of 9.3% from 2021 to 2026. The global barbecue charcoal market size was valued at USD 2.1 billion in 2021, and is projected to reach USD 3.3 billion by 2031, growing at a CAGR of 4.8% from 2022 to 2031. There has been significant increase in the demand for this commodity in the post-COVID era.

4.Global Export of Coconut and its Products

Global export market growth for some selected products for the period from 2000 to 2018 is given in table 4.

5.Export of Coconut and its Products in India

The details of export of coconut and coconut products as well as coir and coir products are given in Table5.

India plays a prominent role in the global coconut and related products supplies. Between 2015-16 and 2021-22, the total coconut exports from India grew at a CAGR of 13%. During 2021-22, the coconut exports of India crossed Rs. 3,236.83 crore (US$ 393 million) mark, an increase of 41% from the previous year. This strong export growth is helping create more employment required in the production of various coconut-based products such as coconut chips, coconut milk, coconut sugar, coconut water, tender coconut water, coconut honey, coconut jaggery, coconut milk shake, coconut snacks, virgin coconut oil, coconut natural cream, etc. that are seeing high export demand. There are about sixty-three top exporting ports in India that trade coconut and related products to its export destinations. Cochin port exports most of the coconut shipments from India with a share of 30%, followed by Tuticorin port with 19.0% share of total coconut exports.

In the year 2020, India's coconut oil exports were valued at US$ 31.8 million, making it the 13th largest exporter of coconut oil in the world. Trade in coconut oil represent 0.031% of total world trade. The exports of coconut oil grew between 2019 and 2020

Table4. Global Export of Coconut and its Products

Products	2000	2010	2015	2016	2017	2018
Coconut (tons)	129,179	302,240	777,022	1,026,918	1,394,423	971,074
Copra	217,637	114,305	227,454	205,443	177,361	219,262
Copra meal	1,122,143	1,014,463	700,598	543,767	589,396	756,463
Coconut oil	21,43,153	2,417,041	2,058,614	1,768,453	2,001,398	2,166,296
Desiccated coconut	278,912	354,485	368,037	383,625	411,037	369,505
Coconut Powder & milk	17,312	47,222	62,862	76,740	-	-
Nata de coco	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Coconut water	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Coco-oleo chemicals	23,532	N.A.	N.A.	N.A.	N.A.	N.A.
Others	N.A.	N.A.	N.A.	N.A.	N.A.	N.A.
Charcoal	59,044	263,026	251,455	320,376	399,625	
Activated Carbon	72,948	104,080	189,938	212,960	241,873	
Coconut shell	59,044	263,026	-	-	-	-
Coir Yarn	15,585	6,395	6,630	5,780	5,135	-
Coir matting	8,288	1,501	1,550	1,389	1,307	-
Coir mats	28,944	64,823	62,471	71,103	72,530	-
Rugs & Carpets	2,603	925	363	184	250	-
Rubberized coir	402	459	955	616	1,208	-
Coir rope	298	366	525	392	541	-
Coir products	117,394	299,820	-	-	-	-

Table 5. Export value of coconut and coir products (Rs. in Crore)

Year	Coconut & coconut products	Coir & coir products	Total
2000-01	27.42	313.66	341.08
2001-02	25.30	320.58	345.88
2002-03	41.90	352.71	394.61
2003-04	42.61	407.50	450.11
2004-05	44.74	473.40	518.14
2005-06	43.65	508.45	552.10
2006-07	51.20	605.17	656.37
2007-08	69.01	592.88	661.89
2008-09	179.81	639.97	819.78
2009-10	432.38	804.05	1236.43
2010-11	525.65	807.07	1332.72
2011-12	838.65	1052.63	1891.28
2012-13	1022.53	1116.03	2138.56
2013-14	1156.12	1476.04	2632.16
2014-15	1312.38	1603.34	2915.72
2015-16	1450.24	1901.43	3351.67
2016-17	2061.7	2281.65	4343.35
2017-18	1764.3	2532.28	4296.58
2018-19	2045.36	2728.05	4773.41
2019-20	1762.17	2757.9	4520.07
2020-21	2294.81	3778.98	6073.79
2021-22	3236.83	2259.55	--
	(*upto March'22)	(^upto Sep.'21)	

by 7.16%, from US$ 4.78 billion to US$ 5.12 billion.

Now , we could see the mind set change from traditional copra to coconut oil to various value added products and by-products and experiencing the outcome will definitely take coconut industry to a new height in the years to come.

The global demand for various products is also showing the potential to exploit the demand. Continuous increase in population and awareness about the health conscious nature of the products will definitely be increasing in the years to come.

6. Annual Average Prices for Selected Coconut Products

Annual Average Prices for Selected Coconut Products is given in Table 6,

Coconut value added products including various products are getting better price than the traditional coconut oil. This also facilitates to establish more coconut-based industries, provide more employment opportunities and earn more foreign exchange through exports.

7. Causes for Low Productivity in Coconut

The low productivity of coconut around the world in general, and in the ICC countries in particular, is due to various reasons viz., the presence of old and senile palms in more than one third of the area, over crowding of palms in some countries and sparse populations in some other countries, planting of non-descriptive varieties without proper selection of either mother palms or seedlings, non

-adoption of scientific input management practices particularly nutrients and water, natural disasters like hurricane, cyclone etc., pests and disease problems, improper harvesting or not collecting the fallen nuts particularly in Pacific countries and above all not having a proper survey of the area, production and productivity and utility of coconut. In addition, coconut predominantly being a small holders' crop, the resource poor farmers are not able to take up replanting due to financial constraints.

8. Ways and Means of Bringing Competitiveness

8.1. *Productivity increase*: Planting of improved varieties and hybrids, adoption of integrated and site specific nutrient and other soil health management, appropriate soil and moisture conservation, integrated pest and disease management, effective utilization of space through inter/mixed /multi- tier cropping / mixed farming systems management, organic farming including organic bio mass recycling *in situ* and through vermicomposting/ use of bio fertilizers etc., will go a long way to produce more nuts /palm.

8.2.*Promote Group/ Cluster Farming Approach*: Such an approach of cluster-based farming, harvesting along with farm level processing by using service providers for timely supplying inputs,help in plant protection, post-harvest and collect raw materials like coconut water, copra or meat, shell, coconut husk, coconut bio mass etc. from coconut based industries for further value addition and revenue realization.

8.3 *Adoption of Climate Change Mitigation Technologies*: The climate change being experienced in coconut growing countries adversely affect the overall growth and productivity. Various climate change mitigation strategies aimed at overcoming biotic and abiotic stresses are to be systematically adopted by coconut farmers.

8.4 *Post-Harvest Processing*: Competitiveness through exploiting emerging new applications for accelerated value addition through developing niche products and by product utilisation like organic foods, virgin coconut oil, coco sugar, functional foods and drinks, cosmeceuticals, oleo chemicals, bio-fuel /bio-lubricants, premium grade monolaurin and HIV/AIDS, high value / eco-friendly coir, shell, trunk and leaf products, which are eco-friendly. These will provide more income per palm.Consumer preferred attractive packaging with proper labelling and maintaining quality with 'Brand Name' will pave the way for better marketing. Now on-line marketing is also gaining momentum.

Table6. Annual Average Prices for Selected Coconut Products (USD/metric ton)

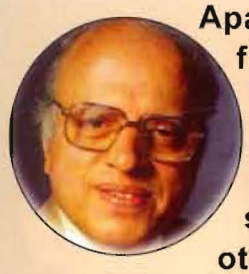
Product	2000	2005	2010	2013	2014	2021	2022
Copra	305	450	730	586	840	905	778
Coconut Oil	450	680	1,114	912	1,257	1139	1669
Desiccated Coconut	791	904	1,637	1,753	2,650	2548	2360
Fatty Alcohol	1,082	1,125	n.a	n.a	n.a	-	-
Fatty Acids	833	830	335	618	729	-	-
Coco Milk (Liquid)	1,361	800	1,771	1,324	2,244	-	-
CocoMilk (Powder)	3,097	2,800	2,715	3,826	5,112	-	-
Mattress Fiber	199	165	185	155	212	220	186
Bristle Fiber	524	460	495	630	632	-	
Coir Rope	599	770	1,511	1306	1,631	-	-
Rub. Fiber	1,526	1,845	2,589	2,724	2,435	-	-
Coir Dust	195	165	217	319	304		-
Shell Charcoal	258	265	317	459	510	441	381
Activated Carbon	994	945	1,380	1,452	1,978	-	-
Coco Water	870	800	1,018	921	1,603	-	-
Nata De Coco	1,114	940	1,104	991	1,013	-	-
Coco Vinegar	779	780	812	705	747	-	-

Source :Compilation from different sources &Co community

8.5 *The other aspects that need attention are*: Promoting the health benefits of coconut and its products; increasing transport, container, shipping facilities at reasonable cost; political will to promote coconut industry through value-chain management; lateral, bilateral, regional, national and international collaborations, and effective transfer of technology through training, demonstration, Farmers Field School, human resource development etc.

Use of IoT,drones for survey, identify pest and disease survey and management, spraying, sensors for moisture management, nutrient management, detection of maturity and harvest, Robotic harvesters, as well as internet marketing etc. will further help to increase competitiveness.

Coconut-based Eco Tourism and establishing Coconut World making available of all technologies,



Apart from the fascinating fact that all the parts, right from its roots to leaf, have something or the other to offer, the magnanimity of this eco-friendly palm in accommodating a large number of crops in its ambit, giving scope for intercropping, multiple cropping, high-density multispecies cropping and mixed farming, paving the way for additional sustainable income, is adorable.

process and products will help to make coconut industry more attractive and competitive.Farmers Producers Organisations can consider to widen their scope right from cultivation to processing to get adequate continuous supply of raw material throughout the year.

9 .For more information you may also refer other articles of the Author as given below:

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