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Trade and value chains in employment-rich activities (TRAVERA): Study of selected non-traditional coconut products in the Philippines

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List of acronyms

AAGR	Annual average growth rate
ACBI	Association of Coconut Brokers, Inc.
ACPD	Association of Philippine coconut Desiccators
AHA	American Heart Association
ARBs	Agrarian Reform Beneficiaries
CBPs	Coco husk based products
CIFA	Coconut Integrated Farmers Association
CNO	Coconut Oil
CORA	Coconut Oil Refiners Association
CSVC	Coco Sugar Value Chain
DA	Department of Agriculture
DCN	Desiccated Coconut
DPWH	Department of Public Works and Highways
FAO	Food and Agriculture Organization
FSCFO	Fabrica Small Coconut Farmers Organization
FTE	Full Time Employment
GAP	Good Agricultural Practice
GMO	Genetically Modified Organism
GMP	Good Manufacturing Practice
HACCP	Hazard Analysis And Critical Control Points
ICT	Information and Communication Technology
ILO	International Labour Organization
KEDP	KAANIB Enterprise Development Project
MEA	Middle East and African Region
MIS	Management Information System
MSME	Micro, Small and Medium Enterprises
NIA	National Irrigation Administration
NTCP	Non-Traditional Coconut Products
OPAFSAM	Office of the Presidential Assistant for Food Security and Agricultural Modernization
PCA	Philippine Coconut Authority
PCOPA	Philippine Coconut Oil Producers Association, Inc.
PEC	Pilipinas Ecofiber Corporation
PhilMech	Philippine Center for Postharvest Development and Mechanization
PMU	Project Management Unit
POMA	Philippine Oleochemical Manufacturers Association
PVT	Ceylon Coir Fiber Industries
UAE	United Arab Emirates
UCAP	United Coconut Association of the Philippines
VC	Value Chain
VCO	Virgin Coconut Oil
VCOPTAP	Virgin Coconut Oil Producers and Traders Association of the Philippines
VCO-VC	Virgin Coconut Oil Value Chain

Executive summary

The coconut industry has been selected by ILO through consultation with stakeholders more particularly with the Philippine Coconut Administration (PCA) of the Department of Agriculture (DA). The industry is the third export subsector of the agriculture sector and involves about 3.1 million farmers spread over 3.5 million hectares of farm land. The industry is export oriented with about 70% of coconut products produced in the country being exported to the Americas region, Africa-Middle East region, European region and the Asia-Pacific region.

The industry consists of two subsectors based on product types, the traditional and nontraditional coconut products (NTCP). CNO dominates the traditional subsector accounting for about 70% to 80% of coconut products export. The NTCP account for about 30% of total exports but has the potential for significant growth and market expansion. Traditional products are facing tough competition from other types of vegetable oils more particularly from palm oil which is a perfect substitute of coconut oil. Currently the price of copra and consequently the price of coconuts have sharply dropped causing alarm in the industry and governments interference to prop up the industry.

Three NTCPs, virgin coconut oil (VCO), coco sugar and coco peat/coir were selected for their export growth potential, generation of employment and creation of decent jobs the areas of interests of the TRAVERA Enterprise study.

Over the years, from 2008 to 2017, the volume, value and price of the country's non-traditional coconut export products (NTCPs) have increased at an annual average growth rate (AAGR) of 25%, 35% and 10%, respectively. The three NTCPs (3NTCPs): virgin coconut oil (VCO), coco sugar, and coco coir/peat represent a large share of the total volume and value of NTCP export accounting for a total of 61% in volume and 91% in value in 2017.

Of the 3NTCPs, VCO is the major contributor to the total export of NTCPs second to coco water with a share of 22% of the total volume and 85% of the total value. The large share of VCO is attributed to the entry of new players, expansion of capacities and the large volume produced by CNO-VCO processors. Coco sugar has a mere contribution of 0.14% to the total volume and 2.0% to the total value while coco husk-based products (CBPs) which is made up of raw and value-added coco coir and coco peat contributed 39% to the total volume and 7% to the total value.

The biggest market of VCO globally is the Asia Pacific Region being driven by food, beauty and cosmetics and health and wellness industries with 38% of the global VCO revenue generated in 2016. Top five markets in this region include Japan, China, Singapore, South Korea and Australia. Three major VCO exporters are also in this region, namely: Philippines, Indonesia and Sri Lanka. The price of VCO was highest at its introduction and market development stage reported at US\$11,000 per MT in 2001 (first VCO export from the Philippines to USA) but continues to decline as the market stabilizes and supply grows. The American Heart Association's (AHA) advisory on transfats' correlation with cardiovascular disease has somewhat negatively affected demand for VCO. Current price is reported at US\$2,522 per MT FOB Manila (PCA, 2017).

The coco sugar major markets are USA, New Zealand, South Africa, Australia, France, Germany, Canada and Norway. Coconut sugar positions as a natural sweetener and healthier alternative to table sugar and artificial sweeteners targeting health conscious people and people with diabetes or other health conditions related to blood sugar. It has an estimated market value of US\$1.3 billion (CBI (2016) as taken from Sweetening the Pot-Palm Coco Sugar South East Asia). Leading exporters of coco sugar in the world in 2017

are Coco Sugar Indonesia, Bigtreefarms Indonesia and Treelife Philippines. Prices of coco sugar remain high as demand outpaces supply. In 2017, its price was about US\$6,860 per MT.

Coir fiber, coco peat, and coconut fiber value-added products which are lumped together as coco coir/peat in the study, are marketed mainly in China, South Korea, USA and Netherlands. The major producers and exporters of coco coir and its variant products are India and Sri Lanka accounting for 90% of the trade of these products. Over the years, the price of raw coco coir has shown a decreasing trend attributed to the slowing down of the Chinese economy and shift of demand to more value-added coir products.

Looking at the position of the Philippines' 3NTCPs in the global NTCP VC, it can be said that the Philippines is a major player in the global market for VCO and coco sugar but not of coco coir/peat. The country's VCO value chain is the top supplier of VCO in the world while the coco sugar value chain ranks second to Indonesia. The coco coir/peat value chain is a minor player and only represents less than one percent of total global export.

The 3NTCP VCs face challenges that constrain its performance as an export-oriented VC. These pervade along its value chain at varying degrees. In general these include difficulty of accessing markets due to production constraints, difficulty to complying with importing countries' standards and other requirements of importers, and competition from other local processors and exporters among others. MSME VCO value chains face stiff competition from desiccated coconut (DCN) VCO processors who dominate the export market. 3NTCP MSMEs taking advantage of the benefits of Free Trade Agreements (FTAs) is minimal.

On the production side below global average productivity has been impacting on price competitiveness and the income of coconut farmers. Farmers with a less than three hectares depending on growing coconut and supplying nuts to CNO, desiccated coconut, VCO and other coconut products processors earn below the poverty line. On the average farmers' landholding is 1.25 hectares. Procurement of raw materials such as nuts and sap therefore, becomes difficult as to sustaining stable supply and maintaining competitive price. An emerging concern in procuring raw materials for VCO and coco sugar is the decreasing number of 'managuetes' or coconut tree climbers to harvest and/or collect sap. For the coco coir/peat collection of husks is the main concern because of access to coconut farm areas and competition from the use of husks as fuel for copra making and for household use.

Processing which is the entry point of the value chain analyses suffers from processing inefficiency and unstable supply of raw materials. The VCO wet processing technology, that is the fermentation method and centrifuge method, of MSME processors are less efficient than the DCN-VCO processors of dry process making them less price competitive. Micro-processors and a number of small processors generally have small processing plant capacity and less financially able to get product certifications and enterprise certifications required by the export market.

According to the 2018 Coconut Industry Value Chain study of the Bureau of Agricultural Research (BAR) among the 3NTCPs the generation of full time employment (FTE) is highest in the coco sugar (1.07 FTE/MT of coco sugar) value chain followed by VCO (0.16 FTE/MT of VCO) and coco coir/peat (0.14 FTE/MT of coco coir). However, if the downstream part of coco coir/peat VC is considered more FTEs are in the twining, weaving and other high value coco coir/peat products processing. Traditional technologies in VCO and coco sugar making and the operation of intermediate processing units create more jobs in these value chains. Expanding into twining, weaving and other high value coco coir/peat products creates more employment in the coco coir/peat value chain.

The country has a number of laws, rules and regulation on quality of work life and decent jobs. However, implementation is a bottle neck for compliance more particularly for micro- and small enterprises. However, for enterprises that export their products compliance is high since GAP, GMP, HACCP and fair certifications is a requirement. These certifications which are renewed annually requires that good working conditions are maintained in the value chain and fair trade is practiced. As noted in the TRAVERA Enterprise survey those who responded compliance to good working conditions and decent jobs are exporters.

The recommendations addressed the VC concerns in marketing, processing and production or raw material procurement. The marketing recommendations include among other things market diversification, setting up a management information system (MIS), collective marketing approach by MSMEs, industry associations and government, strengthening product standardization, promoting organic certified products, government providing incentives for product and value chain certifications, and multiproduct processing.

On the processing side there is a need to improve existing technologies. In VCO processing R&D is needed to improve the recovery rate in fermentation. Incentives are also needed for adoption of the centrifuge method which is more efficient and results to better product standardization. In coco sugar upgrading the drying technology to self-regulated and self-measured equipment improve processing efficiency and product standardization. The establishment of intermediate processing centers or plants is also encouraged to improve the efficiency of the VC, provide opportunity for farmers to forward integrate and generate more employment in the chain. In the coco coir/peat VC technology upgrading is needed in the decortication process for efficiency enhancement and product standardization as well as in the downstream side of twining, weaving and other value addition processes. However, mechanization should be balanced with employment generation as the former could replace workers in the operation.

On the procurement of raw materials, improving the productivity of coconut growers is the main recommendation. This is through the adoption of more superior hybrids of coconuts and adoption of appropriate cultural management practices or compliance to GAP. Another recommendation is the development of mechanical climber to address the problem on shrinking pool of ‘mananguetes’

The interventions in the improvement of the performance of the 3NTCP VCs require strong external support from various service providers. On the government side, there is a need for PCA to strengthen its coconut industry development program specifically highlighting the importance of R&D&E in maintaining the leadership of the country in the NTCPs, innovative financing support to farmers as well as processors, strengthening industry MIS, more market promotion and reforms towards electronic Certificates of Origin (COOs) and self-certification, and linkage to the national single window (NSW). Government, industry associations, MSMEs and other key stakeholders should also work together in bringing about policies and programs that build the competitiveness of the value chains.

By achieving competitiveness in export markets MSMEs can generate more employment, improve quality of working life and create more decent jobs. These are cross cutting issues with similarities in the 3NTCPs. The coco sugar value chain generates the highest full time employments, followed by coco coir/peat then VCO. However, more employment in the VCO are generated if the downstream side of value addition such as twining and weaving are considered. Quality of working life and decent job generation is not a major issue in the 3NTCPs based on the TRAVERA Enterprise survey of 2018. This is particularly true in MSMEs with GAP, GMP, HACCP and ISO certifications.

Compliance with these certifications require that quality of working life and decent jobs are maintained by the enterprise.

The business model recommended by the study considers vertical integration as a means of tying up together and coordinating the various activities of the value chains. With better control of the VCs' performance competitiveness and business sustainability are achieved. As the business model are export oriented certifications are a must to comply with GAP, GMP, HACCP and ISO. With these certifications the enterprise ensures that quality working life and decent jobs are enshrined in the operation of the enterprises.

One of the main features of these models is the establishment of intermediate processing units. For VCO, the intermediate processing plants produce the raw materials for final VCO processing. While for coco sugar, the plants will produce coco syrup which will be finally dried as coco sugar in the central and standardization processing plant. The intermediate processing plant for coco coir/peat is the on farm production of coco coir/peat using portable or small scale decorticators to reduce the cost of transport and involve farmers in value addition. Also community twining and weaving are encouraged to involve the participation of rural workers in the value chain.

1 Introduction and overview of The Philippine coconut sector

International trade and investment linkages in the global economy and the increasing level of trade in intermediates call for an understanding of how **value chains (VCs)** function. A value chain is the full range of activities that are required to bring a product (or a service) from conception, through different phases of production, to delivery to final consumers and disposal after use (Kaplinsky and Morris 2001). Given technological advances and reductions in trade barriers, value chains are becoming more and more global in nature. Developing countries, including the poorest economies, are increasingly participating in the growing network of VCs. Domestic value added created from global value chains can be significant relative to the size of local economies. In developing countries, domestic value-added in global value chains contributes 28% on average to countries' GDP.

As one of the fastest-growing economies in Asia and as one of the top emergent markets in the world today, the Philippines, with its average 6.3 percent GDP growth per annum in the last seven (7) years, is poised to benefit from taking part in the global value chains, provided that the right policies and programmes on trade and employment are crafted, sequenced properly and implemented effectively and strategically.

The ILO Project on Strengthening the Impact of Trade on Employment (STRENGTHEN) aimed to help the Philippines increase and upgrade its export value chains competitiveness through its programme support called Trade and Value Chains in Employment-Rich Activities or TRAVERA. This project component aimed to help Filipino businesses and firms, especially small- and medium-sized export-oriented enterprises by developing a business model that would not only integrate them into the national, regional and global export value chains in a way that results in higher employment and increasing levels of productivity and incomes for workers but also help them fully utilize and avail of the benefits and privileges of international trade agreements.

As a result of extensive tripartite stakeholder discussions and review of relevant and major export statistics and data, the ILO STRENGTHEN Project selected the coconut industry as its export sector of focus on account of the fact that coconut remains as the Philippines' leading agricultural export product and that three (3) of the top 10 agricultural exports are coconut-based export products, namely, coconut oil (both crude and refined), copra cake oil and desiccated coconut. Further, it is estimated that about 1 to 3 million Filipinos are either directly or indirectly employed in the coconut industry. Project partners also highlighted the fact that various by-products could be further developed or produced out of one (1) coconut husk or shell. Among the coconut sub-products mentioned by the project stakeholders that are newly-emerging and have shown encouraging export performance are coconut water, coco coir, coco peat, coco vinegar, and coco sugar, among others.

Given the wide extent and scope of the Philippine coconut industry, project partners further agreed that the TRAVERA programme support component will focus on the studying and mapping out the export value chains of three non-traditional coconut export sectors/products, namely, a) virgin coconut oil, b) coco sugar, and c) coco coir. Although these non-traditional coconut exports are not yet as big as the more established and leading traditional coconut export products of the Philippines, such as coconut oil, copra meal cake, and desiccated coconuts, project partners recognized that since traditional coconut exports are already well-established and are supported by various value chains mapping studies, initiatives and plans, there is a need to focus on the opportunities that the non-traditional coconut export products present for the whole Philippine coconut industry.

Project partners also noted that the government's anti-poverty reduction programmes in the coconut sector are also centered on these sectors, particularly under the KAANIB Enterprise Development Program (KEDP) of the Philippine Coconut Authority (PCA), which implements community/household-level coconut processing (CHLP) programmes that include livelihood and entrepreneurial activities promoting and encouraging coir-based processing (e.g. coir-based organic fertilizer production), coco sugar production, and VCO processing through the establishment of processing facilities, and the provision of machineries and equipment for coir processing, and VCO and coco sugar productions.

Despite these observed potentials, project partners note that the Philippine coconut industry is also wrought with many problems and challenges. It is said to be not only fragmented in economic terms (e.g. quality standards concerns, competitiveness challenges, innovation hurdles, diversification problems, etc) but is also faced with long-standing decent work and gainful employment issues such as informality of employment relations, child labour, high poverty incidence and low income earnings of coconut farmers, lack of labour standards, and safety and health concerns for coconut farm/plant workers, among others.

1.1 Market trends and prospects

1.1.1 Export volume, value and price growth trends

In general, the country's volume, value and price of non-traditional coconut products (NTCPs) exports from 2008 to 2017 advanced at an annual average growth rate (AAGR) of 25%, 35% and 10%, respectively. In the last five years (2013 to 2017) the share of NTCPs to the total export volume of coconut products increased by 5% from a 3% share in 2013 to 8% in 2017. However, its share of export value was constant at 4%.

In spite of its rather small contribution to export the NTCP sector has extensive participation of MSMEs in its value chain creating more employment for rural workers. Export has also gradually and steadily grown but has somewhat slowed down from 2015 to 2017. This could be attributed to supply shocks as well as the slowing down of China's economy, a major market for coconut products.

The annual average growth rate (AAGR) in volume, value and price of NTCPs from 2013 to 2017 show positive trends of 27%, 20% and 1%, respectively (**Table 1**). In 2013/2014, the value of export increased in spite of the 28% in price. This was due to the substantial increase in volume of 95%. In the next period of 2014/2015 although volume remained constant the value significantly increased as price surged by 76%. Price continued to drop in the following year but this was somewhat balanced by an increase in volume. The NTCPs decreasing growth rate can be attributed to the sharp decreases in volume, value and price from 2016 to 2017. This has eroded the gains from 2013 to 2015 wherein export volume and value growths were exceedingly high and there was modest gain in price. These are the periods of supply shock and demand shock.

Table 1 Volume, Value and price growth rates and market share to total NTCP market of 3NTCPs

3 NTCPs	2013			2014			2015			2016			2017			AAGR			2013		2017	
	Vol (MT)	Value (US\$ FOB)	Price (US\$/MT)	Vol (MT)	Value (US\$ FOB)	Price (US\$/MT)	Vol (MT)	Value (US\$ FOB)	Price (US\$/MT)	Vol (MT)	Value (US\$ FOB)	Price (US\$/MT)	Vol (MT)	Value (US\$ FOB)	Price (US\$/MT)	Vol	Value	Price	% share	% share	% share	% share
																			Volume	Value	Volume	Value
Total CPs	2,120,670	1,723,700,113	813	1,829,519	1,793,415,073	980	1,547,421	1,640,415,424	1,060	1,360,828	1,699,841,675	1,249	1,645,305	2,215,808,251	1,347							
Total NTCPs	66,337	65,239,090	983	98,236	157,363,548	1,602	118,870	309,731,541	2,606	75,546	146,546,106	1,940	126,527	82,057,226	649				3%	4%	8%	4%
AGR				48%	141%	63%	21%	97%	63%	-36%	-53%	-26%	67%	-44%	-67%	25%	35%	8%				
1.0 VCO	7,061	28,149,000	3,987	26,421	116,732,000	4,418	64,316	279,674,000	4,348	41,092	118,672,764	2,888	27,719	69,912,822	2,522				11%	43%	22%	85%
				274%	315%	11%	143%	140%	-2%	-36%	-58%	-34%	-33%	-41%	-13%	87%	89%	-9%				
2.0 Coconut Sugar	0.34	0	0	0	0	0	0	0	0	0.34	1,225	3,603	181	1,240,571	6,860				0%	0%	0.14%	2%
AGR													53085%	101171%	90%							
3.0 Cocomusk based	29,638	18,545,045	626	35,906	20,315,772	566	27,276	15,028,770	551	17,227	13,936,059	809	49,047	5,451,411	111				45%	28%	39%	7%
AGR				21%	10%	-10%	-24%	-26%	-3%	-37%	-7%	47%	185%	-61%	-86%	36%	-21%	-13%				
3.1 Other Raw Coir	24,866	8,378,872	337	31,106	8,556,819	275	16,085	4,005,099	249	6,644	1,802,994	271	19,051	2,668,672	140				84%	45%	39%	49%
AGR				25%	2%	-18%	-48%	-53%	-9%	-59%	-55%	9%	187%	48%	-48%	26%	-15%	-17%				
3.2 Coco Peat	1,316	282,710	215	4,002	757,252	189	5,658	480,696	85	4,235	385,529	91	28,283	1,962,484	69				4%	2%	58%	36%
AGR				204%	168%	-12%	41%	-37%	-55%	-25%	-20%	7%	568%	409%	-24%	197%	130%	-21%				
3.3 Coco Twine	2,058	3,646,285	1,772	110	267,363	2,431	251	659,813	2,631	283	899,905	3,178	191	426,994	2,232				7%	20%	0.39%	8%
AGR				-95%	-93%	37%	128%	147%	8%	13%	36%	21%	-32%	-53%	-30%	3%	9%	9%				
3.4 Baled Coir	657	300,391	457	235	58,186	248	5,070	7,038,708	1,388	5,956	10,776,625	1,809	1,386	327,061	236				2%	2%	3%	6%
AGR				-64%	-81%	-46%	2057%	11997%	461%	17%	53%	30%	-77%	-97%	-87%	483%	2968%	90%				
3.5 Coco Dust	556	166,958	300	54	31,748	588	83	77,953	937	108	61,862	573	130	66,197	509				2%	1%	0.27%	1%
AGR				-90%	-81%	96%	54%	146%	59%	30%	-21%	-39%	20%	7%	-11%	3%	13%	26%				
3.6 Pads/liner	184	5,769,829	31,290	399	10,644,405	26,678	107	2,766,379	25,910	1	9,144	6,927	0	0	0				31%	5000.58%	0.00%	0.00%
AGR				116%	84%	-15%	-73%	-74%	-3%	-99%	-100%	-73%	-100%	-100%	-100%	-39%	-47%	-48%				
Total 3NTCPs	36,699	46,694,045	1,272	62,327	137,047,772	2,199	91,592	294,702,770	3,218	58,320	132,610,048	2,274	76,947	76,604,804	996				55%	72%	61%	93%

Source of data: PCA

The supply of nuts considerably dropped in the aftermath of Typhoon Yolanda that hit Eastern Visayas (Region VIII) on November 7, 2013. The typhoon destroyed about 33 million trees – nearly half of which were completely damaged, according to PCA. Another typhoon, typhoon Ruby, hit the region and damaged at least 200,000 trees by the end of 2014. The region produces about 2 billion nuts in the pre-Yolanda period, the second highest in the country. Coconut production in this region is still recovering and as of 2017 it has harvested only about 1.085 billion nuts, just half of its original production capacity.¹

In the demand side, China which has generated nearly a third in global growth in the past decade, is showing sign of weakness. Manufacturing activity contracted in 2017 for the first time in 19 months as new orders fell and retail sales slowed down. Firms have reported softer demand despite some discounting.² China's GDP annual growth rate dropped from 7.9% in 2013 to 6.7% in the first quarter of 2016. The slowing down of the economy has significantly reduced their importations.

What is the implication of China's weakening economy to the export of coconut products in general? Chinese industry is closely integrated in global supply chains. It is one of the major importers of CNO and coco coir products. As far as NTCPs is concerned, coco coir products suffered the most from this development. As a result many coco coir processors particularly those that were highly dependent on the Chinese market closed.³

¹ Region 8 coconut industry on road to recovery after 'Yolanda'. Philippine News Agency, June 18, 2018.

² Decoded: The Chinese economic slowdown. www.economictimes.com. January 22, 2019.

³ Davao TRAVERA Validation Workshop, December 2018.

The three NTCPs (3NTCPs) represent a large share of the total volume and value of NTCP export. In 2013 these products account for 55% and 72% of the total NTCP export volume and value, respectively. In 2017 these climbed to 61% of volume and 91% of value.

VCO Of the 3NTCPs, virgin coconut oil (VOC) is the major contributor to the total export of NTCPs second to coco water. In 2013, it accounted for 11% and 43% of the total volume and value of NTCP exports, respectively. These doubled in 2017, with respective shares of 22% and 85%. The Virgin Coconut Oil Producers and Traders Association of the Philippines (VCOPTAP) attributed this situation to the 24% drop in sales of VCO in the USA as a result of the negative American Heart Association (AHA) advisory against saturated fats.⁴ This could also be due to an oversupply with the entry of new players, expansion of capacities and the large volume produced by CNO-VCO processors (VCOP, 2019). The latter accounts for about 70% to 80% of VCO exported.

The negative impact of the AHA advisory however, is slowly fading as shown by a 10% higher 2018 first quarter export compared to the same period last year. According to the VCOP demand in the USA has already recovered as of April 2018. Furthermore, increased imports from countries in the Asia-Pacific, Germany, Canada and the Netherlands have contributed to this recovery.⁵

Coco sugar: As far as coco sugar is concerned, its export growth trend could not be ascertained because of the absence of historical data. PCA has started monitoring its export only in 2017. Data in this particular year showed an export volume of 181 MT valued at US\$1.24 million with a price of US\$6.85 FOB per kilogram. Its share of the total export volume and value of NTCPs were 0.14% and 2.0%, respectively.

Coco coir/peat: The coco husk based products (CBPs) which is made up of raw and value added coco coir and coco peat on one hand contributed about 45% of volume and 25% of value in 2013. These however, substantially dropped to 39% and 7%, respectively, in 2017. Growth rate of export showed a positive trend in 2013 to 2014 but sharply declined onward. The AAGR of volume was a positive 36% value has a negative growth rate of -15% due to a negative AAGR of price of -15%. The positive growth rate in volume was mainly due to the 187% increase in 2017 compared to the previous year. However, the growth rate of price and value were negative reflecting the trend in the last five years. This trend reflects the trend of the other raw coco coir products and coco peat that account for 97% of volume and 85% of value of coco husk based products. The average growth rate of the value of raw coco coir product was negative at -15% in spite of a positive AAGR of 36%. This is due to a negative AAGR of price of -31%. Coco peat on the other hand experienced positive AAGR in volume and value because of sharp increase in export in 2017. However, price's AAGR rate is a negative -21%. Growth rate trends especially price will continue to be influenced by the performance of China's economy and the exports of India and Sri Lanka, the two top coco coir based products manufacturers and exporters in the world. These two countries account for about 90% of the world's export of these products.

The erosion of China's imports of coco coir, nevertheless, has somewhat been tempered by the increase in demand of the domestic market for geonets and other environmental damage mitigating products. In 2012, the Government through the Department of Public Works and Highways (DPWH) mandated through DPWH Department Order 41 the use of

⁴ Marco Apolinario C. Reyes. President Virgin Coconut Oil Producers and Traders Association of the Philippines. Virgin Coconut Oil: Overview, Processes, Drivers and Outlook. 1st World Coconut Congress Conference and Exhibition 2018. SMX Convention Center Manila, Pasay City, Philippines. August 14-16, 2018.

⁵ Ibid.

coconut bioengineering technology (i.e., coco nets, coco logs, coco twine and coco peat) in all of its construction projects if necessary. The agreement made by the Office of the Presidential Assistant for Food Security and Agricultural Modernization (OPAFSAM) of the Aquino administration with the National Irrigation Administration (NIA), DPWH and PCA to expand and coordinate in the utilization of coconut bioengineering technology in the country has further widen the use of these materials. Moreover, the mining industry has adopted these materials in their mining operations and explorations.

1.1.2 Demand and price trends

The global demand trends vary with the type of product and with geographical market locations. There are four factors that define and qualify the entry of coconut products manufacturers in global markets. These are price, quality, volume and consistency. This has been validated by the TRAVERA Enterprise survey of MSME processors and exporters of coconut products.

Out of these attributes quality, volume and consistency are the market qualifiers. This means that these are pre qualifications by buyers before deciding to purchase a product or products. The final deciding factor or market winner product attribute for the buyer's final decision to buy is price. Buyers stress the importance of these attributes to their suppliers to ensure that they will receive consistently competitively priced and consistent quality and volume of products.

The Philippines is a major player in the global market for VCO and coconut sugar but not of coco coir/peat. The country's VCO value chain is the top supplier of VCO in the world while the coco sugar value chain ranks second to Indonesia. The coco coir/peat value chain is a minor player and only represents less than one percent of total global export.

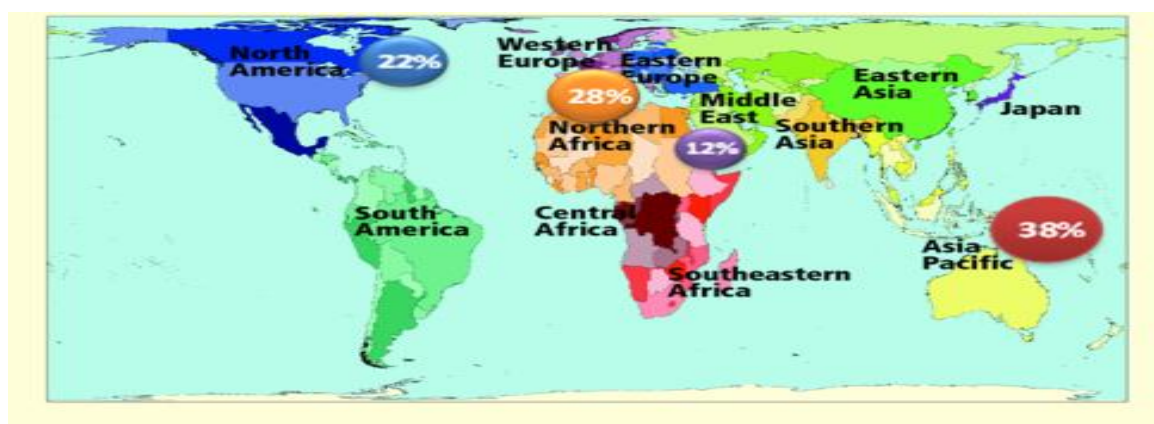
The markets of the 3NTCPs can be classified into four geographical or regional segments. These are the Asia-Pacific Region, European Region, Middle East and African Region (MEA) and the Americas Region. The Asia-Pacific Region are the countries located near the Western Pacific Ocean. It is also known as Asia-Pac or APAC. Some of the countries in this region are China, India, Sri Lanka, Singapore, Japan, South Korea, Taiwan, Indonesia, Malaysia, Thailand, Vietnam and Australia, Fiji, Guam, Hawaii, and Papua New Guinea. The European countries include the members and non-members of the EU. The most notable are Germany, France, UK and Russia. The USA, Canada, Mexico and the South American countries consist the Americas Region. The MEA countries are the African continent countries and the Middle East countries of Abu Dhabi, Qatar, Kuwait and Kingdom of Saudi Arabia.

1.2 Virgin coconut oil (VCO)

Markets

Asia-Pacific Region: The demand of VCO in the Asia-Pacific region like the other Regions is driven by the food, beauty and cosmetics and health and wellness industries. The five top markets are Japan, China, Singapore, South Korea and Australia. The three major exporters in these markets the Philippines, Indonesia and Sri Lanka, are found in this region.

Figure 1 Market share of different regions in the global market of VCO



Asia-Pacific is the largest market accounting for 38% of the global VCO revenue generated in 2016. Aside from being the largest market it is also the largest producer and exporter of virgin coconut oil. The market shares of the other regions are: North America (22%), Europe (28%) and Middle East and Africa (MEA) (12%) (*Figure 1*).⁶

European Region: Increasing awareness of consumers towards healthy lifestyles and diets drive the demand of VCO in this region. Several health studies on virgin coconut oil one of which is on the proven reduction of cholesterol levels, have created enthusiasm in the use of this product among consumers.⁷ From a niche market product VCO has entered main stream markets and are now widely available in outlets such as large supermarkets.

Europe's rapid VCO market growth is demonstrated by the UK's growing demand for VCO. At present it is spending 16M pounds annually on coconut oil. This is 70 times its import of VCO in 2012.⁸ The Region imports from the Philippines, Sri Lanka, Indonesia, India, Thailand, Malaysia, and Papua New Guinea.

In 2015, the EU imported US\$58.732 million worth of VCO from the Philippines⁹ which represents 21% of its total export. The main importing countries were the Netherlands (9%), Germany (8%), Belgium (2%) and the United Kingdom (2%). Import from Sri Lanka on the other hand was about 24% of its total export. The importing countries were Germany (10%), the United Kingdom (7%), the Netherlands (4%) and Sweden (3%).

Middle East and African Region (MEA) VCO has gained inroads in this region particularly in Dubai and the United Arab Emirates (UAE). Vita Coco, a subsidiary of VitaCoco, the leading coconut water producer and exporter in the world that also produces VCO, has introduced VCO products in the UAE. According to its market research the MEA has a potential market for coconut products of about US\$10B.¹⁰

The encouraging growth of the VCO market has attracted the entry of coconut processors in Africa. One of these firms is the ROCAC Group from Nairobi, Kenya which has started to export VCO and coconut water to the UAE and other countries.¹¹

⁶ <https://www.technavio.com/report/global-food-global-virgin-coconut-oil-market-2017-2021> October 26, 2018

⁷ CBI Product Fact Sheet: Virgin Coconut Oil in Europe. CBI Ministry of Foreign Affairs.

⁸ <http://www.who.int/mediacentre/factsheets/fs310/en/> November 11, 2018.

⁹ FOB Manila

¹⁰ Technavio research, undated.

¹¹ <https://industrytoday.co.uk>.

Americas Region: Likewise the popularity of VCO in the Americas is increasing as consumers become more aware of its health and nutritional benefits. The perception that virgin coconut oil helps in fighting obesity and overweight related issues in a region where these are considered as pressing health issues is driving demand for the product. This is more apparent in the US market, the major VCO importing country in the region.¹² In 2015, it absorbed more than 50% of the Philippines' and 41% of Sri Lanka's total VCO exports.

Sales/Revenue

Industry forecasts a continuous rising trend in demand of VCO. The current VCO's market size of US\$2.1 billion is estimated to reach US\$4.2 billion by 2024 (Global Institute for Tomorrow, 2017). This consists of sales of traditional and new VCO products.

Market researches point to a sustained demand growth. The Technovia research forecasts an annual average growth rate (AAGR) of around 11% from 2016 to 2022. This implies that the 2016 revenue of about US\$1.0 billion will reach US\$1.28 billion in 2022 (**Table 2**).¹³ Another market research conservatively forecast growth rate at a CAGR of 2.3% from 2018-2025.¹⁴ Based on this growth trend the estimated global market value of US\$650 million in 2017 will be about US\$780 million in 2025.

Table 2 Forecast value of global export of VCO 2016-2022

Year	Value US\$B)	AGR
2016	0.69	
2017	0.76	10%
2018	0.84	11%
2019	0.94	12%
2020	1.04	11%
2021	1.15	11%
2022	1.28	11%

The VCO and VCO-based products' increasing volume of sales on-line and in supermarkets and special retail as food and beauty and cosmetics products are indicative of its growing popularity among consumers. In 2015

BodybuildingWarehouse.co.uk (British web shop), an online retailer of VCO products reported a 67% increase in sales of organic VCO in the first 3 months of the year alone.¹⁵ The VCO exports of the Philippines to the US is consistent with this trend. In

2001, its first export of about 2,000 MT substantially grew to 28,000 MT in 2015 (UCAP, PCA 2017).

Although demand is increasing, growth rate has somewhat slowed down. The European market has started to stabilize in 2016 and growth started to stall. The US market also showed signs of slowing down as inferred from the decreasing export of VCO by the Philippines starting 2016. The US is the top export destination of Philippine VCO.

The slowing down of demand growth can be reinvigorated by expanding to still unsaturated markets and by promoting VCO for industrial applications. The VCO industry has to overcome some challenges in the food market principally the American Heart Association's (AHA) advisory on the negative effect of coconut oil on health which has been attributed as the main reason for the dampening of demand in the past years. Industry

¹² Ibid.

¹³ <https://www.statista.com/statistics/875977/organic-virgin-coconut-oil-market-value-worldwide/> October 24, 2018.

¹⁴ <https://industrytoday.co.uk/chemicals/virgin-coconut-oil-market-will-reach-780-million-us--by-the-end-of-2025--growing-at-a-cagr-of-2-3- published July 04, 2018.>

¹⁵ CBI Product Fact Sheet: Virgin Coconut Oil in Europe. opcit

wise, the use of VCO in food products is not popular. However, there are some manufacturers who have been using VCO in the European market for their products such as Get Fruity Bar (United Kingdom), Bio Paranus-Guarana Riegel (Germany) and Lifefood Coconut Bar (Germany/Europe).¹⁶

Price

The price of VCO was highest at its introduction and market development stage. In 2001, the price of the first VCO export from the Philippines to the USA was US\$11,000 per MT. A decade later the price fell to just over US\$ 3,000 per MT as export volume increased (Bawalan 2011: 9)¹⁷. Though price has risen to US\$4,348/MT FOB Manila in 2015, it decreased by 42% to US\$2,522/MT FOB Manila in 2017 (PCA, 2017).

In the Asia Pacific region, Nature Pacific Ltd., the largest Australian-based importer of Fiji VCO has advised Fiji producers of a reduction in price to remain let alone expand in the market of VCO in Australia. According to the company previous FOB prices, such as AU\$ 12/ liter, are no longer feasible and it believes that current realistic prices are AU\$ 3.50/liter for good quality non – organic VCO and AU\$ 4.00–AUD 4.50/liter for organically certified VCO.¹⁸ As the market continues to stabilize and supply grows the downward trend of price will persist.

1.3 Coconut sugar

Coco sugar positions itself in the market for sugar as a natural sweetener and a substitute product. Global databases on agricultural production and trade flows do not currently monitor coconut sugar as a separate commodity from other types of sugar and sweeteners. This makes it difficult to accurately estimate its market size and trade volumes as indicated by the varying estimates of market researchers.

The PCA (2017) estimated the global market for sweeteners at about US\$1.1 billion. This is under estimated when we consider the US\$9.2 billion estimate of Europe's Center for the Promotion of Imports (CBI 2016). It forecasted a much larger market size of US\$14 billion by 2020. Artificial sweeteners account for more than 70% of this market and are much cheaper than natural sugar options. However, natural sweeteners are exhibiting faster growth due to growing health concerns about artificial sweeteners and traditional sugar. This is reinforced by government policies (such as taxes) and pro-active actions taken by the food industry, such as product reformulation or use of alternative sweeteners. These are happening in coconut sugar's major markets such as the USA, New Zealand, South Africa, Australia, France, Germany, Canada and Norway.¹⁹

The estimated market value of coconut sugar is placed at US\$1.3 billion.²⁰ Coconut sugar or coconut sap or 'nectar' sugar positioned as a natural sweetener and as a healthier alternative to table sugar and artificial sweeteners (e.g., acesulfame-K, aspartame, cyclamate, neotame, saccharin, sucralose) in the market targets health conscious people and people with diabetes or other health conditions related to blood sugar. This is one of

¹⁶ Ibid.

¹⁷ As taken from Andrew McGregor and Mark Sheehy. An overview of the market for Pacific Island coconut products and the ability of industries to respond. Pacific Island Farmers Organization Network. 2017.

¹⁸ Ibid.

¹⁹ www.grandviewresearch.com November 02, 2018.

²⁰ CBI (2016) as taken from Sweetening the Pot-Palm Coco Sugar South East Asia. www.anandaadventures.net

the major reasons why it is becoming one of the top growing natural sweetener in the US market.²¹

Table 3 Glycemic index values of different types of sweeteners

Sweeteners	GI	Sweeteners	GI
Stevia	0	Coconut Sugar/Nectar	30
Monk fruit	0	Palm Jaggery	35
Yacon Syrup	1	Raw Honey	35-58
Xylitol	7	Malted Barley	40
Agave	15-30	Sucanat	43
Date Sugar and Syrup	20	Organic Sugar	47
Brown Rice Syrup ¹	25	Maple Syrup	54
Blackstrap Molasses	54	Evaporated Cane Juice	55
Raw Sugar (Turbinado)	65	White Sugar	80
Corn Syrup	75	High Fructose Corn Syrup	87
Brown Rice Syrup ²	98	Glucose	100

¹Traditional ²Industrialized

As a sweetener it competes not only with artificial sweeteners but also with other natural sweeteners such as stevia and monk fruit. The main selling point of the product is its low glycemic index (GI) and nutritional value. Although coconut sugar's glycemic index range of 35-40 is higher than stevia's score of 0, it's still considerably lower than table sugar's index which is in the mid-to-high 60s (**Table 3**). It has nutritional values such as being rich in minerals,

amino acids and vitamins which artificial sweeteners and other types of sugars do not have. It is also being differentiated as 100% organic and non-GMO.

Markets

Asia-Pacific Region: The largest market in Asia-Pacific is Indonesia where coconut sugar has been used for centuries. However, consumption largely depends on domestic production.²²

In terms of coco sugar export Japan is the largest market due to its traditionally high demand for imported sugar and large consumption base. Japan produces beet sugar and cane sugar with the former centered in Hokkaido and the latter in Okinawa and the islands of Kagoshima. *However, domestically produced sugar meets only about one quarter of domestic demand and the rest of the supply is from import.*²³

The other markets in this region are Australia, South Korea, China, Singapore and New Zealand. Australia is currently importing coco sugar from the Pacific countries such as Papua New Guinea.

European Region: Most of the importers from Europe come from the northwestern (UK, Netherlands, and Germany) part, where there are greater consumer interest in natural products. European consumers more particularly German consumers are more concerned than ever of healthier diet and lifestyle choices, and with that the level of public scrutiny over ingredients in food and drink products has never been higher. *Sugar, in particular, has gained more importance surpassing fat and salt as the primary consumer concern.*

²⁴

²¹ <http://grovara.com/top-growing-natural-sweetener-coconut-sugar/> November 01, 2018

²² Sweetening the Pot, Developing the market for Palm & Coconut Sugar in Southeast Asia.

Ananda Ventures. June

2017.http://exchange.growasia.org/system/files/Sweetening%20the%20PotPalmCocoSugarSoutheastAsia_Final.pdf

²³ Japanese Sugar Market, FAO. <http://www.fao.org/docrep/005/X0513E/x0513e11.htm>

²⁴ Katya Witham op. cit.

Consumers' perception blames high sugar consumption for the rising rates of obesity and diabetes and as such, an increasing number are looking for healthier sweetener options or substitutes. Since they often equate health with naturalness, they prefer natural sugar substitutes, such as honey, agave nectar or stevia over cane sugar and artificial sweeteners. About 36% of German consumers cite naturalness as an important factor when buying

sugar and sweeteners. This has put food and drink manufacturers under pressure to satisfy consumer demand for healthy yet tasty products.



Figure 2 Food products using coconut sugar as sweetener

chocolate confectionery to bakery, snacks and breakfast cereals.²⁵ **Figure 2** shows some of the coconut sugar sweetened products in Germany. These products have strong health claims, such as all-natural, organic, vegan or free-from products.

Americas Region: The US is the main market for coconut sugar in the Americas region while Canada is an emerging market. There is more potential for higher growth in the US market. Although it holds only a fraction of the sweetener market when compared with stevia, the top natural sweetener in the US market, *the market for coco sugar has more than doubled to \$22 million from 2014 to 2015 making it the top growing natural sweetener*. By comparison, the market for stevia grew 12.3% in 2015 to reach nearly \$430 million, and the market for blends of stevia and other artificial sweeteners grew 1.5% to reach nearly \$452 million.²⁶

The growing popularity of coconut sugar in the US can be attributed to its low GI and nutritive value, environmental sustainability and how well it substitutes for traditional cane sugar. As a healthier alternative to table sugar, it appeals to people with diabetes or other health conditions related to blood sugar, a growing concern by people of affluent economy.

Coconut sugar's low environmental impact is another element that appeals to green consumers in this market. The Food and Agriculture Organization (FAO) regards coconut palm sweeteners as the single most sustainable sweetener in the world. According to the website of coconut sugar supplier Big Tree Farms²⁷, "coconut sugar is considered one of the, if not the most, sustainable sweeteners in the world."

Compared to sugar cane, coconut trees require less water and fertilization, produce more per hectare, and support multi-cropping of other crops such as cacao, banana, coffee, corn and cassava. Coconuts require less water and are rain fed. They produce 50%–75% more sugar per hectare than sugar cane on average. Harvesting is done daily whereas sugar cane is an annual crop. By intercropping with other crops the carbon sequestration capacity

²⁵ Ibid.

²⁶ <http://grovara.com/top-growing-natural-sweetener-coconut-sugar/> op. cit.

²⁷ Big Tree Farms is a chocolate processing and coconut processed products making company based in Badung, Bali, Indonesia. It is considered as one of the biggest if not the biggest supplier of coconut sugar in the world.

of coconut farms per unit area is enhanced as well as income per unit production area is substantially increased.

Sales/Revenue

As mentioned earlier global databases on agricultural production and trade flows do not currently track coco sugar as a separate commodity from other types of sweeteners, making it difficult to get accurate estimates of the market size and trade volumes. Values of market size and revenues found in literatures therefore, are mere estimates of researchers.

GrowAsia estimates coco sugar as a US\$ 1.3 billion industry which is just 1.68% to 1.31% of the overall total sugar and sweetener industry market with a value ranging from US\$77.5 to US\$99.1 billion depending on the year and volatility in sugar prices. The US is the largest market for coco sugar with a value of US\$22 million in 2015. It has more than doubled since 2014 making it the fastest growing sweetener in the US. However, this is only 5% of the US\$430 million market value of stevia in 2015 which remains the most prominent natural sweetener in the US. In Europe, the estimated market for coco and palm sugar is between 1,500-3,000 MT per year, this constitutes at most 0.02% of the total European sugar market.²⁸ This represents vast potential for future expansion for coco sugar.

Consumption of natural sweeteners will continue to grow in the future driving higher revenues for coconut sugar exporting countries. Aside from its low GI, an attribute attractive to health conscious consumers, it has been declared in 2014 by the Food and Agricultural Organization (FAO) as the most sustainable sweetener. Compared to cane sugar, coconut trees produce 50 to 75% more sugar per hectare but use less than one fifth of the soil nutrients and water.²⁹

Indonesia will maintain its dominance in the market due to its stable and more advance manufacturing base. However, the Philippines will increase its market share as more producers enter the market and as they adopt more improved processing technology.

Out of the 15 top global coco sugar exporting firms, five are from the Philippines, three from Indonesia, two from the USA, two from India, one from Thailand and a multi-country based distributor. A brief description of these firms are shown in **Table 4**.

Table 4 Leading exporters of coconut sugar in the world, 2017

Company	Brief Description
1. Coco Sugar Indonesia	The largest and leading organic coconut sugar producer-exporter in Indonesia. Established in 1939 in Banyumas region the center of organic sugar production in Indonesia. It also produces and export other kinds of coconut products.
2. Bigtreefarms (Indonesia)	Indonesian company based in Bali producing and exporting organic coco sugar in three flavors: Brown, Golden and Vanilla. The products are certified organic, fair trade, GMO-free, gluten-free and vegan.
3. Treelife (Philippines)	A coconut processing firm located at Carmen, North Cotabato in the Mindanao Region. Produces and

²⁸ Ananda Ventures, op. cit.

²⁹ <https://cocosugar.com>

	exports organic coconut sugar (Class A and B) and variants of coco products such as cocosyrup, VCO, cocoflour, cocojam, cocoaminos, cocowine and coconut sugar coated banana chips.
4. Saudi Food Ingredient Factory (Saudi Arabia)	A Jeddah, Saudi Arabia based sugar manufacturer and trader. It reprocesses sugar customized to buyers' requirements. It also repacks brown sugar, muscovado sugar and coconut sugar.
5. The Coconut Company	A distributor of processed coconut products that include coconut sugar, VCO, and other processed coconut products. Its distribution centers are in the UK, Singapore and Hong Kong. The products are certified gluten free, EU organic farming, non-GMO and USDA Organic. Its suppliers are Filipino and Sri Lankan processors.
6. Holos Integra (Indonesia)	A processor and exporter of certified organic coconut sugar based in Bali, Indonesia. It supplies the Americas, Europe and Asia-Pacific.
7. Celebes Coconut Corporation (Philippines)	A processor-exporter of organic and fair trade coconut sugar and 13 other coconut products based in Butuan, Cagayan de Oro. The products are EC/EU organic certified and have other relevant certifications.
8. Earth Circle Organics (USA)	A wholesale importer and distributor of organic coconut sugar, other types of coconut products and other 'superfoods' based in Northern California, USA. Sources from several countries and provides buyers with products packaged in retail and bulk-display.
9. Coconut Secret ADON Exports (India)	An Indian firm based in Tamil Nadu, India that exports multi-agribased products including organic coconut sugar.
10. Los Ricos Compania Corporation (Philippines)	A sole distributor of Coco Natura coconut products such as organic coconut sugar, VCO and coconut jam. It is based in the Philippines with its processing operation based at the Mindanao Region.
11. Ecobuddy Export (India)	A multiproduct exporter that includes organic coconut sugar based in Tamil Nadu, India. Its products are produced locally and imported from other coconut processing countries.
12. Franklin Baker Corporation (Philippines)	One of the largest coconut desiccated coconut producers and suppliers in the world. Produces and exports arrays of coconut processed products including coconut sugar, coconut water, VCO, coconut cream, coconut flour and coconut chips. Operates two processing plants.
13. MADHAVA SWEETENERS (USA)	An exporter-distributor of sweeteners mainly honey and organic coconut sugar based at Colorado, USA. Brands its products as Madhava Sweetener.
14. TARDO Filipinas (Philippines)	A subsidiary of Tardo Group of Companies that manufactures and exports organic certified products such as coco sugar from the Philippines.
15. Urmatt and Sun Opta (Thailand)	A Thailand based processor and exporter of organic coconut sugar and other types of organic certified agricultural based processed products.

Source: Technovia Research, undated.

Although there are more processor-exporter of organic coconut sugar in the Philippines, it still lags Indonesia which has three firms as top exporters. The Philippines and Indonesia are main sources of conventional and organically certified coco sugar by global distributors. They purchase coco sugar in bulk which are then repacked and relabeled in the consolidation and distribution center. ***There is also the possibility that***

Philippines exporters who have limited production capacity import from Indonesia to fill up the short fall in supply.

With supply still lagging demand, Philippine coconut sugar processors-exporters have the opportunity to expand their operation to fill up the gap. The supply limitation and a relatively high price (US\$6,860/MT FOB Manila as of 2017) has attracted large coconut processors such as Franklin Baker to venture into organic coconut sugar export. Meanwhile other medium sized SMEs such as Treelife, Pasiolco, and Greenline are into expansion modes as they increase their processing capacities and getting more coconut farms for replanting and for organic certification.


Prices

The prices of coconut sugar vary with quality, origin and brand. In 2017, the FOB price of coconut sugar was about US\$6,860/MT. This is almost double compared to the 2016 price of US\$3,603/MT (PCA, 2017). Coconut sugar is priced higher than other sweeteners as it is positioned as an organic and premium product. For example in the US, Morning Pep coconut sugar retailed at US\$16.90 per 3 pounds (1.36 kilograms) or US\$5.63 per pound which is 222% more expensive than cane sugar at US\$6.99 per 4 pounds (1.81 kilograms) or US\$1.75 per pound.

Table 5 shows some of the retail prices of coconut sugar sold in the US and Europe. The Glory Bee coconut sugar packed and imported from the Philippines is competitively priced at the retail level at US0.021/gram against coconut sugar imported from Indonesia and from other sources that are being packed in the US. One with an unknown source has the lowest retail price of US0.13/gram.

Prices will remain high for some time as demand will continue to outpace supply. Raw material (coco sap) supply will be a long term challenge for processors. Delay in the replanting of senile trees, difficulty of accessing superior varieties, traditional method of collecting sap and competition from other processors are key factors constraining coco sugar production and export. It will take more than five years before a coconut tree could produce the optimal volume and quality of sap. Moreover, competition of raw material from other coconut products processors such as CNO processors adds up to supply constraint.

Table 5 Some coco sugar retail packs sold in European markets

Brand	Origin	Price	
		Size	Price (US\$)
Glory Bee Cocosugar 	Philippines	10 oz jar (283.5 gm) 40 oz jar 23 oz jar 6/10 oz jar	5.99 17.99 11.99 29.94
Honest to Goodness coconut sugar 	Imported from Indonesia and packed and sold in Australia	200 g 5KG 500g 25KG	7.95 54.60 12.50 187.50
Sun Food coconut sugar 	Imported from Indonesia, packed and sold in the US.	1 pound/ 225 gram	5.99
Morning Pep coconut sugar 	Source unknown. Repacked in the US	6 lbs 3 lbs	26.99 16.90
Now Real Food coconut sugar 	Source unknown. Repacked and sold in the US	16 oz (453.59 gm)	5.69

Source: Internet scoping

The entry of large processors such as Franklin Baker in the Philippines, who have the capacity to adopt more modern processing technology to produce in large scale, could however, impact on the future price. The extent of the influence on prices of the entry of these large players will depend on their production capacity and rate of supplying the market.

Coconut fiber, coconut peat and other coir products

Coco coir and coco peat are processed coco husks which are byproducts in the production of copra and desiccated coconut. The coco coir are strands of coco fibers used in manufacturing valued added products such as, ropes, twine, brooms and brushes, doormats, rugs, mattresses and other upholstery, often in the form of rubberized coir pads³⁰, and coconets and bio-logs for erosion control, desertification and river banks rehabilitation³¹. The coir dust or coco peat is a byproduct of making coco coir and has many horticultural and agricultural uses like as soil conditioner to substitute for peat moss, as component of organic fertilizer and as potting soil.

The major producers and exporters of coco coir and its variant products are India and Sri Lanka. They account for 90% of the trade of these products. India is the dominant producer and exporter of raw coco coir and value added products while Sri Lanka is the top producer and exporter of coco peat. The major markets for these two products are China for coir fiber, South Korea, USA, and Netherlands for coco peat and the USA and Europe for the other coconut fiber value added products.³²

³⁰ Coir Board, Ministry of MSME India, www.coirboard.gov.in in November 04, 2018

³¹ Compendium of Commercially-viable Coconut Technologies. DOST-PCAARRD. Book Series No. 04/2015.

³² Coir Board of India op. cit.

The coco coir and coco peat industry is a major source of employment in the rural sector and a major contributor to the economy of India and Sri Lanka. In India the coco coir industry generates employment to about 500,000³³ people mostly women working part time while in Sri Lanka it employs about 35,000 workers³⁴. Coco coir export in Sri Lanka accounts for 6 percent of its agricultural export, over 1.0% of all its exports and 0.35% of its GDP.³⁵

The products

Coco coir are fibers extracted from the husk which is the outer cover of coconut fruit, with or without retting or soaking. The husk either comes from green or immature coconut or from mature or brown nuts. There are several classifications of coco coir and this is based principally on fiber length. These are the long or bristle fibers, mattress fibers and mixed fibers. The determinants of quality are fiber length and the amount of peat or dust removed from the fiber.³⁶

Exports are in the form of baled raw coco coir and value added coco coir products. The value added products include coir yarn, handloom mat and matting, power loom mat matting, tufted mats, geotextiles, coir rugs and carpets, coir rope, rubberized coir, and others.³⁷

The coconut peat are the fine particles churned out in the process of decorticating coconut husk to produce coco coir. Loss in their raw form, these are compressed (**Figure 3**) into rectangular blocks to increase their density. In this form, it facilitates efficient logistics handling, transport and warehousing. Coco peat is regarded as a substitute for peat moss by horticulturists and landscapers and is extensively used as a soil medium for potted plants and as a soil ameliorant in landscaping, greenhouse growing and field growing of vegetables and other ornamental plants.

Figure 3 Coco peat bricks



There are many types of exported coco peat products. Sri Lanka exports four types which are the 5 kg coco peat block, 25 kg-bag coco peat block, 500 gms/650 gms coco peat brick and coco peat grow bags. The latter is in a loose form and the rests are compressed. The composition of these products can be customized depending on the requirements of the buyer. Commercial vegetable and ornamental plants (i.e., cut flowers, cut foliage, potted

plants) growers are the major market for loss coco peat. Retail outlets are the buyers of coco peat bricks which are popular in small scale household gardening in export markets.

Product specifications differentiate each product type by form and characteristics. **Table 6** shows the standard specifications of coco peat brick of Ceylon Coir Fibre

³³ ibid

³⁴ <http://www.srilankabusiness.com/blog/more-value-addition-will-drive-the-growth-of-sri-lankan-coir-industry.html> October 24, 2018

³⁵ Coir Board of India op. cit.

³⁶ Compendium of Commercially-viable Coconut Technologies. op. cit.

³⁷ Coir Board of India op. cit.

Industries (PVT) Ltd. of Sri Lanka.³⁸ The company can change the standard to suit buyers' requirements as indicated in the last row of the specification table.

Table 6 Ceylon coir fibre industries (PVT) Ltd specifications of cocopeat bricks

Raw Material	100% Natural Coco Peat (mixing ratio can be changed as per the Buyer's requirement)
Brick Size	20 x 10 x 5 cm (+/- 0.5 cm)
Compressed	8 : 1
Weight	500grms (+/- 50grms) & 650grms (+/- 50grms)
Moisture	below 20 %
Electric Conductivity (EC) - range	200 µS/cm – 1,600 µS/cm (Both 1:3 & 1:5 Test Method) – As per the Buyer's preference
pH	5.5 - 6.8
After expansion volume	8 - 10 Liters per Brick
Packing & Loadability	2200 Bricks on a Pallet - 20 Pallets for 40' HC Container (Avg. 26 M/Tons). * Wrapped Bricks with Buyer's specified Labels are available.
Note : All specification can be changed with Buyer's preferences.	

Source: Ceylon Coir Fibre Industries (PVT) Ltd

Marketing and markets

Globally around 650,000 MT of coir³⁹ are produced annually, mainly in India and Sri Lanka. India and Sri Lanka are also the main exporters, followed by Thailand, Indonesia, Malaysia, Vietnam, and the Philippines.

Export in the form of raw fiber represents around 80 percent of coir production. Value added coir products such as yarn, mats, matting and rugs account for a small part of the volume but has more value compared to raw coir. Importing countries use raw coir for industrial, environmental protection and horticultural purposes.

The analysis of the coco coir and coco peat market focuses on India's and Sri Lanka's production and trade since they are the dominant players in the global value chain of these products. Most of the data and information referenced India's Coconut Coir Board of the Ministry of MSME and Sri Lanka's Ceylon Coir Fiber Industries (PVT) Limited.

In the absence of a 10 year historical data the analysis infers from the 2012/2013 and 2013/2014 export data. Based on the Coir Board of India report, from April 13, 2013 to March 14, 2014, India exported 537,040 MT of 13 assorted coco coir fiber and coco peat products valued at Rs147,603.84 Lakh (US\$ 233.591 million).⁴⁰ The five top export products account for 96% of volume and 92% of value (**Table 7**) of these products. These are tufted mat (Rs41,776.39 (US\$66.11 million)/28.30%), coco peat (Rs34,173.23 Lakh (US\$54.08 million)/23.15%), coco coir (Rs32,878.11 Lakh (US\$52.03 million)/22.28%), handloom mat (Rs23,623.82 Lakh (US\$37.38 million)/16.00%) and geotextiles (Rs3,503.78 Lakh (US\$5.5 million)/1.0%).

³⁸ Ceylon Coir Fibre Industries (PVT) Ltd. <http://ceyloncoirfibre.com/cocobrick.php> November 04, 2018.

³⁹ Coir – FAO. <http://www.fao.org/economic/futurefibres/fibres/coir/en/> October 24, 2018

⁴⁰ Based on the Indian rupiah exchange rate of Rs6,318.90:US\$100 in December 31, 2014.

Table 7 Summary of coconut coir products from India, April 2011 –March 2012 to April 2012 –March 2013

Item	Apr '13 - Mar '14			Apr '12 - Mar '13			% growth cumulative		
	Q	V	Price	Q	V	Price	Q	V	Price
1 Cococoir/coir fiber	173,902	32,878.11	0.189	140,693	20,707.66	0.147	23.60%	58.77%	28.45%
2 Coir yarn	4,247	2,848.26	0.671	4,202	2,387.22	0.568	1.07%	19.31%	18.05%
3 Handloom mat	22,609	23,623.82	1.045	24,151	22,810.10	0.944	-6.38%	3.57%	10.63%
4 Powerloom mat	234	278.36	1.190	2	3.15	1.575	11600%	8736.83%	-24.47%
5 Tufted mat	43,752	41,776.39	0.955	37,289	33,572.91	0.900	17.33%	24.43%	6.05%
6 Handloom matting	3,425	3,353.91	0.979	1,418	1,702.77	1.201	141.54%	96.97%	-18.45%
7 Powerloom matting	0	0.00	0.000	0		0.000	0.00%	0.00%	0.00%
8 Geo textiles	4,468	3,503.78	0.784	3,597	2,628.74	0.731	24.21%	33.29%	7.30%
9 Coir rugs and carpet	93	105.99	1.140	95	133.38	1.404	-2.11%	-20.54%	-18.83%
10 Coir rope	498	390.17	0.783	420	282.41	0.672	18.57%	38.16%	16.52%
11 Curled coir	11,263	2,947.93	0.262	8,883	2,112.46	0.238	26.79%	39.55%	10.06%
12 Rubberized coirt	965	1,560.76	1.617	322	495.01	1.537	199.69%	215.30%	5.21%
13 Cocopeat (coir pith)	271,495	34,173.23	0.126	208,399	24,727.61	0.119	30.28%	38.20%	6.08%
14 Coir other products	89	163.13	1.833	30	39.33	1.311	196.67%	314.77%	39.81%
Total	537,040	147,603.84	0.275	429,501	111,602.75	0.260	25.04%	32.26%	5.77%

Source: Coconut Coir Board of the Ministry of MSME OF India

Compared to the previous period, the export in volume and value on April 2012 to March 2013 increased by 25.04% and 32.26%, respectively. The other top export products experienced positive growth rates except for handloom mats with 6% reduction in volume but compensated by an increase of price of 10.63%.

In the period April 2012-March 2013, India exported coir and coir products to 112 countries. The USA was the top export destination with a share of 22.79% of the total value. The combined exports of EU countries which include Netherlands, UK, Germany, Italy, Spain, France, Belgium, Denmark, Portugal, Finland, Sweden, Irish Republic, Austria and Greece was 26.05% in terms of quantity and 33.02% in terms of value. China, South Korea, Australia, Russia, Canada, Brazil, and Japan were the other countries where there were substantial export volume. **Tables 08** shows the export destinations by country.

Coco coir In 2014, India's coco coir enterprises exported to 23 countries with China as the main destination representing about 98% of volume and value of total export. The other top four destinations were the USA, Netherlands, Greece and Yugoslavia (**Table 09**). The annual growth rate (AGR) in volume and value were 24% and 61%, respectively.

Table 8 Top five export destinations of coco

Country	2013-14		Growth Rate	
	Q	V	Q	V
1 China	98.54	98.45	24.4	60.7
2 USA	0.38	0.44	-20.8	-15.2
3 Netherlands	0.20	0.27	-42.0	-37.1
4 Greece	0.24	0.23	90.3	92.3
5 Yugoslavia	0.21	0.19	-	-
Total	99.57	99.58		

With export practically dependent on the China market, demand growth was not sustained and started to drop as China's economic growth slowed down.

Source: Coconut Coir Board of the Ministry of MSME OF India

Coco coir tufted mats

The PVC tufted mats export flowed to 79 countries with five countries accounting for 67% of total volume and 68% of total value (**Table 9**). The USA was the top destination with a market share of about 32% in volume and value. Exports in these countries showed positive growth rates except for the UK with an insignificant drop of 1.5% in volume.

Table 9 Top five export destinations of coco coir tufted mats, India

Country	2013-14		Growth Rate	
	Q	V	Q	V
1 USA	31.77	32.59	22.7	30.0
2 UK	13.34	12.36	-1.8	2.0
3 Germany	10.73	11.65	10.1	18.4
4 Italy	7.32	7.1	20.9	33.2
5 France	4.08	4.24	21.5	32.5
Total	67.24	67.94		

Table 10 Top five export destinations of coco peat, India

Country	2013-14		Growth Rate	
	Q	V	Q	V
1 South Korea	24.64	20.15	31.4	38.4
2 Netherlands	18.07	19.93	11.3	21.8
3 USA	10.70	11.32	-10.4	41.2
4 Spain	7.11	7.20	34.6	57.1
5 Australia	3.62	5.24	37.1	32.5
Total	64.14	63.84		

Source: Coconut Coir Board of the Ministry of MSME OF India

Table 11 Top five export destinations of handloom mat, India

Country	2013-14		Growth Rate	
	Q	V	Q	V
1 USA	36.35	41.18	-2.2	7.5
2 UK	9.11	8.50	7.3	16.4
3 Australia	4.58	4.44	-14.9	-5.4
4 Netherlands	4.46	4.39	29.1	37.9
5 Canada	3.04	3.41	3.9	22.0
Total	57.54	61.92		

Source: Coconut Coir Board of the Ministry of MSME OF India

Coco peat

India exported coco peat to 77 countries with South Korea, Netherlands, USA, Spain and Australia as the top five destinations (**Table 10**). These countries account for 64% in volume and value of export of this product. All exhibited significant growth rates in volume and value except for the USA's import volume that dropped by 10.4%. South Korea uses coco peat not only for horticultural purposes but for agricultural application and animal bedding.

Handloom mat

This product was exported to 81 countries with the top five importing countries representing a market share of 58% in volume and 62% in value (**Table 11**). The USA is the largest market with market shares of 36% in volume and 41% in value.

All showed positive growth rates compared to the previous year except for Australia with its volume share dropping by about 15% and value share by 5%. On the other hand the USA's import volume decreased by 2.2%.

Geotextiles

India exported geotextiles to 24 countries with USA, Australia, Japan, France and Germany as the top five destination countries. These countries represent about 84% in volume and value of geotextiles export. The USA is the top destination accounting for 29% and 28% of the export volume and value, respectively (**Table 12**). Growth in this market dropped by 10.5% in volume and 1.0% in value compared to the previous year.

Table 12 Top five export destinations of geotextile

Country	2013-14		Growth Rate	
	Q	V	Q	V
1 USA	29.04	27.78	-10.5	-1.0
2 Australia	23.98	18.84	109.6	100.0
3 Japan	11.34	14.89	21.0	33.8
4 France	13.51	13.95	20.3	43.4
5 Germany	6.56	8.61	30.2	61.5
Total	84.43	84.07		

Source: Coconut Coir Board of the Ministry of MSME OF India

highest growth in value due to a substantial increase (24%) in volume and price (28%). This price is also the highest among the coco coir products.

Sales/Revenue

The estimated volume of 537,040 MT of varied coco coir products that India exported from April 13, 2013 to March 14, 2014 amounted to US\$ 233.591 million. This is a 40% increase compared to the previous period and an increase of 212% compared to the 2004 to 2005 export value. Five products accounted for 92% of the volume and 96% of the value (**Table 13**).

As shown in the table, all products showed positive growth in volume and value except handloom mat which dropped by 6.38% in volume compared to the previous year. Coco coir gained the

Table 13 Top five coco coir exports by volume, value and growth rate, India

Item	Apr '13 - Mar '14			Apr '12 - Mar '13			% growth cumulative		
	Q	V	Price	Q	V	Price	Q	V	Price
1 Tufted mat	43,752	41,776.39	0.955	37,289	33,572.91	0.900	17.33%	24.43%	6.05%
2 Cocopeat (coir pith)	271,495	34,173.23	0.126	208,399	24,727.61	0.119	30.28%	38.20%	6.08%
3 Cococoir/coir fiber	173,902	32,878.11	0.189	140,693	20,707.66	0.147	23.60%	58.77%	28.45%
4 Handloom mat	22,609	23,623.82	1.045	24,151	22,810.10	0.944	-6.38%	3.57%	10.63%
5 Geo textiles	4,468	3,503.78	0.784	3,597	2,628.74	0.731	24.21%	33.29%	7.30%
Sub-Total	516,226	135,955	0.263	414,129	104,447	0.252	24.65%	30.17%	4.42%
6 Others	20,814	11,649	0.560	15,372	7,156	0.466	35.40%	62.79%	20.22%
Total	537,040	147,604	0.275	429,501	111,603	0.260	25.04%	32.26%	5.77%

Source: Coir Board, India

Q (quantity) in MT V (value) in Rs Lakh 1 Lakh = Rs100,000

Price

Coco coir products' price status and movement is inferred from India's 2013-2014 trade of these products. In this period, price ranges from Rs0.126 Lakh (US\$199.20) per metric ton to Rs1.045 Lakh (US\$1,654) per metric ton. The lowest priced product is coco peat and the highest priced is handloom mat (**Table 13**). Coco coir's price of Rs0.189 Lakh (US\$299.20) was the second lowest. Overall, price increased by about 6%.⁴¹

⁴¹ Coir Board India op. cit.

In 2016, however, the price of coco coir started to drop in the last quarter of 2016 and remained weak in the beginning of 2017. In Sri Lanka, the average price of coco coir dropped to US\$ 110/MT in February 2017 after stagnating in the second half of 2016. Whereas the price of coco coir in Indonesia started to decline in the last quarter of 2016 and reached US\$ 268/MT in February 2017. *The coco coir industry attributes the decrease in price of raw coco coir to the slowing down of the Chinese economy and shift of demand to more value added coco coir products.*⁴²

Global supply and demand trends

Although the demand for coco coir and coco peat has somewhat slowed down, the Coir Board of India projects global demand to rebound and maintain a positive growth rate in the future. The drivers of growth are the eventual recovery of China's economy, wider and more industrial applications of coco coir products and the intensified application of coco peat in horticulture as a substitute medium for peat moss in landscaping works and in potting medium formulation in horticulture. China absorbs approximately 70-75% of the total coir fiber being exported. It feeds the raw material for industrial applications as its economy and population grow. The estimated requirement is about 450,000 metric tons per year that is projected to grow by 10 to 20% per year (Arancon, 2013). In South Korea, cocopeat has found wider application in agriculture such as in rice farming. In the Middle East, such as Saudi Arabia, Kuwait and Qatar, coco peat could substitute for peat moss as a soil conditioner for 'imported' soil for landscaping and horticultural applications.

The latest data from the Coir Board of India show that in the period of April - July 2016, its export of coir and coir products was 269,757 MT valued at Rs. 67,399 lakhs or equal to US\$ 105.6 million (1 lakh = US\$1,566.72)⁴³. This is a 20.2% increase compared to revenue in 2015 during the same period. These four month exports represent almost half of the 2013-2014 total export. The Coir Board is upbeat that revenue will still be increasing due to a growing demand from importing countries, such as China and USA.

India and Sri Lanka will stay as the leading exporters of coco coir products in the future but the Philippines, Indonesia and Vietnam will have modest gains in their export as demand continues to rise and as they improve their productivity. *Raw coco coir and coco peat products will stay as the dominant export in terms of volume outpacing the other coco coir based value added products except tufted coco coir mats.* However, in terms of value the value added products will generate more revenue.

In the April-July 2016 period, the combined exports of coco coir and coco peat of India accounted for 89% of the total global export of coco coir products by volume.⁴⁴ This is a substantial gain in market share compared to the 45% combined share in 2013 to 2014. There is also a shift of the major importers of Indian coco peat. In 2013-2014, the major importers are South Korea (24.64%), Netherlands (18.07), USA (10.7), Spain (7.11) and Australia (6.22). These countries accounted for about 64% of total cocopeat export. In 2016 the main destinations shifted to the USA (24.3%), China (8.4%), Netherland (5.2%), South Korea (8.4%), and UK (4.8%). The substantial increase in the US import could be attributed to its improving economy.

Sri Lanka like India will continue to be a major supplier of coco coir products with coco peat as its dominant product. Coco peat contributed the highest revenue to Sri Lanka's coir products. It accounted for 35.3% of its total export in 2016. Japan is the major importer

⁴² https://apccsec.org/statistics/market_review/file/coirmarch17_October_24_2018

⁴³ *ibid*

⁴⁴ *Ibid*

of this product which uses it as agricultural soil media for greenhouses and for outdoor agricultural and horticultural crops application, fertilizer, animal feed and sometimes bedding for animal. In 2016, Japan imported 47,212 tons or 25.3% of Sri Lanka's total export of 186,820 MT of coco peat. ***The Philippines export to Japan of coco peat is only 131 MT (PCA, 2018).*** The other major markets are South Korea, Mexico, China, USA, UK, Iran, and Spain with a combined import of 77,376 MT or 41.4% of the total export of coco peat.

Figure 4 Woven Panama Nature Fiber Embossed Molded Engraved Rubber Back Non Slip Coco Coir Coconut Fiber Door Mats, molded pots and molded planters



Sri Lanka's export volume of coco peat in 2016 experienced a positive growth of 10% over the previous year. Noteworthy of Sri Lanka's coco coir products exports is the growth of molded coir products. These products include tufted and rubberized products (**Figure 4**). It registered a positive growth rate of 40% in volume from 49,448 MT in 2015 to 69,412 MT in 2016.

Supply from Indonesia, Philippines and Vietnam are minimal. Exports from these countries are principally baled coco coir. In 2016, Indonesia's export was 30,153 MT worth US\$ 7.4 million. This volume is 15% lower compared to the previous year. This export

practically represents baled coco coir most of which China absorbed. The volume was 25,509 MT or 84.6% of Indonesia's export of coco coir. The rest flowed to Japan, South Korea, Malaysia, and Singapore.

1.4 Policies, programmes and projects for the coconut industry

This section summarizes national and sectoral strategies, plans or programmes that are pertinent to the coconut export value chain in the Philippines and thus, are relevant to the value chain analysis of the three non-traditional coconut products.

National level policies relevant to the agricultural sector refer to those found in the 25-year plan of the Philippines referred to as AmBisyon Natin 2040 which was signed by President Duterte on October 11, 2016. AmBisyon Natin 2040 foresees that the Philippines becomes a "prosperous, predominantly middle-class society where no one is poor." It also envisions Filipinos with "long and healthy lives," being smart and innovative, and living in a "high-trust society." Under this long-term vision, the government will aim to "triple real per-capita incomes and eradicate hunger and poverty by 2040, if not sooner." To implement this vision, the National Economic and Development Authority (NEDA) is guided by the Duterte administration's 10-Point Socioeconomic Agenda which includes the promotion of rural and value chain development toward increasing agricultural and rural enterprise productivity and rural tourism.

Coconut Levy Fund. Enacted under the administration of former president Ferdinand Marcos in 1971, the coconut levy fund is a state-enforced tax imposed on coconut products and collected from the coconut farmers to be used supposedly for the development of the coconut industry and improvement of the lives of coconut farmers. To date, however, there are no evidences that the funds were actually used for the sector. Both the Senate and the Lower House of Philippine Congress have crafted several bills on

developing mechanisms on how to utilize and allocate the said fund.⁴⁵ As of writing, a proposed bill seeking to introduce mechanisms for the “disposition of some coco levy assets, management and utilization of the available coco levy funds, providing coconut farmers a say on how the fund will be managed, invested, allocated, and utilized” has been filed in the Senate under the 18th Congress.⁴⁶

Meanwhile, as the government agency tasked to develop the industry to its full potential, the Philippine Coconut Authority (PCA) pursues sustainable development of a globally competitive coconut and other oil palm industry by implementing the following programs and projects in support of PCA's Coconut Industry Development Roadmap:

KEY AREA	PROGRAMME AND ITS FEATURES
Poverty Reduction and Empowerment of the Poor and Vulnerable	<p>KAANIB ENTERPRISE DEVELOPMENT PROJECT (KEDP) promotes coconut-based enterprises through an integrated resource service convergence approach to increase farm productivity and incomes of the small coconut farming communities. Its four components are:</p> <p>1. COCONUT- COFFEE BASED ENTERPRISE DEVELOPMENT PROJECT (COCOBED) or the provision of high quality coffee seedlings such as Robusta, Arabica, Excelsa and Liberica and fertilizer (both organic and inorganic) to support the growth and development of the newly transplanted coffee. It is implemented in coconut areas highly suitable for coffee production and in clustered coconut farms of at least 50 hectares in identified KAAINB Sites.</p> <p>2. COCONUT INTERCROPPING PROJECT (CIP) involves intercropping of annual biennial and perennial crops such as corn, banana, pineapple, and fruit bearing trees depending on the geographical location, land suitability, agro-climatic conditions, market demands and farmer's skills. It also includes livestock raising under the coconuts.</p> <p>3. COCONUT-CACAO ENTERPRISE DEVELOPMENT PROJECT (CCEDP) or the provision of high quality cacao seedlings and fertilizer support (organic and inorganic) to ensure maximum growth.</p> <p>4. COMMUNITY/HOUSEHOLD-LEVEL COCONUT PROCESSING (CHLP) promotes coconut-based enterprises in the different KAAINB sites for increased productivity and income/job. It also aims to foster the entrepreneurial skills of the community or household members of the community. Priority livelihood activities include coir-based processing including coir-based organic fertilizer production, coco sap sugar production and virgin coconut oil (VCO) production. This involves the establishment of processing facilities and the provision of machineries and equipment such as decorticating machine, bailing, twining and looming machines for coir processing; expeller or pressing machine for VCO production and various equipment for coco sap sugar production.</p>
Rapid, inclusive and sustained economic growth	<p>COCONUT FERTILIZATION PROJECT (CFP) aims to increase coconut production by using the widely accepted, cost-effective and environment-friendly Agricultural Grade Salt (AGS) at 2 kilograms per tree, and combination of AGS at 2 kilograms per tree and Coir-Based Organic Fertilizer (CBOF) at 4 kilograms. The project also aims to promote wider</p>

⁴⁵ Castillo, M. and Ani, PA. (). The Philippine Coconut Industry: Status, Policies and Strategic Directions for Development. Available online at: <http://ap.fttc.agnet.org/index.php>

⁴⁶ <https://newsinfo.inquirer.net/1136319/pangilinan-refiles-coconut-levy-fund-bill>

	<p>use of available coco peat in the area to provide coir-based processor and producers with alternative market for such by product.</p> <p>KAANIB COCO AGRO-INDUSTRIAL HUB (KCAHP) aims to establish what is referred to as “coco hubs” in different coconut-producing provinces through strategic partnerships between PCA and coconut farmer’s organization or cooperatives, local government units (LGUs), and social business enterprises, among others. It has a Central Business Unit (CBU) that acts as primary or secondary processor of coconut products into value added products, integrator, consolidator, market, as well as source of technology and information; and the “spokes” which shall form the base for entrepreneurial business operations of the CBU.</p>
Integrity of the environment and climate change mitigation and adaptation	<p>ACCELERATED COCONUT PLANTING & REPLANTING (ACPRP) promotes coconut planting in open and suitable areas and replanting of senile and unproductive coconut trees and those damaged by natural calamities using farmer’s preferred variety such as tall and dwarf varieties sourced within the locality. The project components are:</p> <ol style="list-style-type: none"> 1. PARTICIPATORY COCONUT PLANTING PROJECT (PCPP) which refers to cash incentives to qualified farmer participants for every good seedling produced, transplanted and stabilized on their own farms. 2. COCONUT SEEDLINGS DISPERSAL PROJECT (CSDP) involves the distribution of good quality coconut seedlings to coconut farmers or group of coconut farmers and partner implementers such as LGUs, IPs, NGOs, other GAs and other industry. 3. INDIGENOUS PEOPLE’S OUTREACH PROGRAM (IPOP) encourages indigenous peoples (IPs) to participate in the coconut planting and replanting program either through PCPP or CSDP approaches and schemes depending on their capability and availability of sources of planting. <p>SMALL HOLDER OIL PALM DEVELOPMENT PROGRAM (SOPDP) promotes oil palm plantation development focusing on smallholders through organized growers or out-growers scheme with marketing tie-ups with the oil millers.</p> <p>MAINTENANCE OF COCONUT SEED FARM / SEED GARDEN Maintenance of seed gardens are continuously being operated and undertaken in support of the long-term coconut planting and replanting program of the Philippine Coconut Authority.</p> <p>YOLANDA REHABILITATION AND RECOVERY PROGRAM (YRRP) As an immediate response to the aftermath of the Yolanda typhoon aimed at recovering the livelihoods of coconut farmers in the affected provinces in Region 6 (Western Visayas), Region 7 (Central Visayas) and Region 8 (Eastern Visayas). It has these components:</p> <ol style="list-style-type: none"> 1. COCONUT PLANTING/REPLANTING or the replacement of all coconut trees rendered crown-less and fallen by the typhoon thru proactive funding and sourcing from research center and accredited suppliers. A new planting scheme- “tatluhan” or three (3) seedlings per hill scheme is introduced which is proven to be typhoon resilient and higher in productivity per unit area. Participants of this project were allocated a cash incentive of P30 per seedling planted. The allowable landholding area by individual participants is from 0.5 to 5 hectares only. 2. COCONUT INTERCROPPING involves the planting of short gestation and annual crops in unutilized spaces in between coconut trees. This aimed to ensure food security and hunger mitigation

	<p>during the aftermath of the typhoon and provide livelihood and income generation for the coconut farmers.</p> <p>3. COCONUT FERTILIZATION refers to the rehabilitation of slightly, moderately and severely damaged coconut trees thru the application of Inorganic Multi-Nutrient Fertilizer to immediately regain vigor. Free fertilizers were distributed and applied and cash for work incentive of P25 for every tree fertilized were given to qualified participants.</p> <p>4. DEBRIS MANAGEMENT AND INTEGRATED RHINO-BEETLE CONTROL or the cutting of coconut trees into lumber for housing/shelters purposes as a way of clearing the land for replanting, fertilization and intercropping and to prevent pest infestation.</p> <p>5. INTEGRATED PEST MANAGEMENT which is part of the treatment protocol against Coconut Scale Insects (CSI) and other pests and diseases. Activities like trunk injection, leaf pruning and massive production of biocontrol agents are being undertaken. Biocontrol laboratories are established to increase the production of both predators and parasitoids required to control and prevent CSI.</p>
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2 Value chains in the three non-traditional coconut products

This section looks into the value chains existing in the selected non-traditional coconut products guided by ILO's approach to value chain development for decent work.⁴⁷ The approach helps in identifying export-oriented activities in the 3 NTCPs that have the potential to create quality jobs in the pre-identified non-traditional coconut export sectors of VCO, coco sugar and coco coir.

2.1 VCO value chain

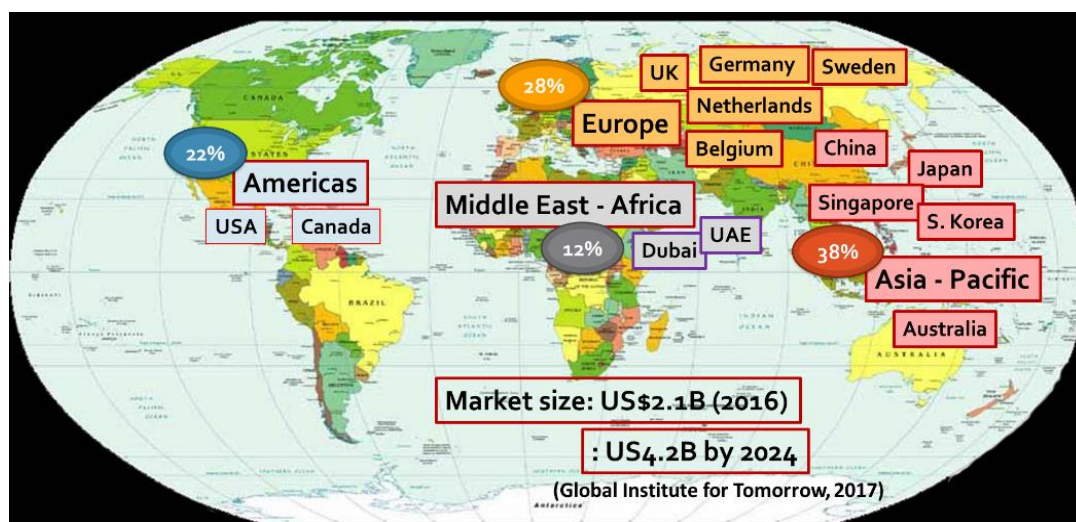
With a market share of 38%, Asia-Pacific is the major market of Philippine VCO. The top producers and suppliers in the world operates in this region. The combined share of the Americas and Europe Regions represent half of the total global market for VCO (**Figure 5**). The Middle East-African Region though being the smallest (12%) market shows a steady and rising growth rate.

The Global Institute for Tomorrow estimated the global VCO market size at US\$2.1B in 2016. It forecasts the doubling of the market to US\$4.2B by 2024. This was based on the assumption of continuous growth of the global economy and the absence of supply shocks.

The Philippines is the top producer and exporter of VCO in the world. Desiccated coconut (DCN) processing plants which have the flexibility to produce VCO are the main producers. They either export or sell to traders/exporters or directly export their products making use of their extensive marketing network for desiccated coconut products and other products such as coconut flour and coconut water.

⁴⁷ ILO (2009). Value Chain Development for Decent Work: A guide for private sector initiatives, governments and development organizations/Matthias Herr and Taprea Muzira.

Figure 5 VCO market shares and top importing countries by region, projected market size (2016-2024)



There are 12 desiccated coconut processing facilities in the country with the capacity to produce 851 MT per day of VCO.⁴⁸ They account for 70% to 80% of total export with the rest coming from VCO MSMEs. The top producing firms are Peter Paul Philippines, Franklin Baker Company of the Philippines, Ica Translink Philippines, Primex Coco Products Incorporated, Pacific Basic Foods Incorporated, Celebes Coconut Corporation, Muenster Ingredients and Axelum Inc., Coco Davao Incorporated, and Superstar Coconut Products Company.

These companies originally established for desiccated coconut products have evolved to integrated coconut processing plants. For example, the 13 hectare Processing Plant of Peter Philippines started as a desiccated processing plant and overtime has slowly transformed to an integrated multi-product processing plant for desiccated coconut and its variants, coconut milk and cream, coconut water, *virgin coconut oil*, coconut flour/fiber, copra, copra cake, coconut oil, paring cake, paring oil and other residual products.⁴⁹

The integrated approach to processing allows flexibility in operation which enables production to shift from poor market performing products to the more profitable products. This production approach is similar to the dualistic production of Brazilian sugar mills that process both sugar and bioethanol from sugar cane. Flexibility in processing technology allow these plants to shift from one product to another depending on market conditions. When the bioethanol is more profitable in the market and the demand is high, the plants produce more of this product and less of sugar and vice versa.

The DCN-VCO value chain overlaps with coconut oil production and the production of other coconut processed products in the procurement of raw materials (i.e., husked nuts). This overlap creates tightness in the procurement of nuts when there is a shortfall of supply. According to the DTI Region XI, the Davao Region faces a 3 million MT coconut deficit a year that many processors source out from the Visayas to fill the supply gap. The cause

⁴⁸ Value and Supply Chain Assessment for Processed Coconut Products in the Philippines, Integra LLC, Millennial Challenge Corporation, March 15, 2017.

⁴⁹ www.peterpaul.com.ph, December 13, 2018.

of this problem is the widening gap between supply and demand as supply remains stagnant while demand is growing at 3% to 5% per year.⁵⁰

Some of the MSME VCO process`sor-exporters operate integrated processing plants of coconut products. Their other products besides VCO are coconut vinegar, coconut flour, other processed coconut products and other agricultural based food products.⁵¹ For example, Kablon Farm in Tupi, South Cotabato in Mindanao process VCO and other food products such as VCO based soap, coconut jam, fruit jams, fruit juices and concentrates, and chocolates. Greenlife in Tayabas, Quezon in Luzon produces VCO as well as coco vinegar, coco balsamic and variants of coconut products.

2.2 Coconut sugar

The Philippines is a minor player in the global trade of coconut sugar. However, there are no historical records of exports before 2016 to determine its growth trend. Government before this year does not regard it as a priority product. According to DTI, it does not monitor and track export performance of products that are not considered as a priority (KII with DTI, 2018).

The markets of Philippine coco sugar are the Americas, European and Asia-Pacific Regions. The country's coco sugar export pales in comparison with that of Indonesia. In 2015, Indonesia exported coco sugar with a value of US\$38.23 million while the value of Philippine's export in 2017 was merely US\$1.24 million. This comparative wide gap in export value is an indication of a large potential export market expansion for Philippine coco sugar. Moreover, the trend of world demand for coco sugar is rising.

There are five coconut sugar manufacturing companies in the Philippines that are on the top 15 global producers and exporters. These companies are in a position to expand their operations to take advantage of the growing demand.

2.3 Coco coir/peat

India and Sri Lanka will maintain their dominance of the global trade of coco coir and coco peat products. The government of these countries fully supports the development and growth of these industries since they are major export products, they contribute significantly to GDP and generate employment for rural workers and women. Institutional supports in R&D&E and finance keep the industry vibrant and prop up their competitiveness in the global market.

The Philippines is a minor player in the trade of coco coir/peat products. In 2017 the country's export of these products was valued at US\$5.142 million which is just 14% of India's average export. These products are more domestic market oriented. The inclusion of the products as requirements in the DPWH and NIA construction projects and the decline of export as a consequence of the slowing down of China's economy have shifted traders' preference from export to the domestic market. The utilization of geonets, geologs and other environmental mitigation materials by the mining industry has further enhanced the attractiveness of the local market.

The volume of export will continue at its present pace. The growing US economy could somewhat serve as a buffer of the declining China market. However, industry is

⁵⁰ Davao Region eyes importing coconut from Indonesia. www.mindanao.com, December 12, 2017.

⁵¹ TRAVERA Survey, June 2018 to January 2019.

optimistic that in no time China's economy will recover and with it the recovery of demand for these products.

There are opportunities for expansion of the markets of coco coir and coco peat more particularly of the latter. In the Middle East, soil for landscaping and even in farming are imported. The usual practice is to mix peat moss and soil ameliorants such as vermiculite and/or perlite to 'sweet' sand⁵² to produce a soil mix suitable for landscaping, farming and for greenhouse growing. Aside from the export market, coco peat producers could further expand in the domestic market particularly in the horticultural sector. Untapped are customized soil mix for various agricultural and horticultural uses.

2.4 Market requirements of the export market

Buyers consider several factors when purchasing. These include price, quality, volume and service outputs. The service outputs include the capability of the exporting enterprise to provide bulk-breaking when necessary, spatial convenience, waiting of delivery time, product variety, consistency of delivering or supplying the right quality and volume at a competitive price and information provision. The ILO TRAVERA REECS survey results have indicated that price, quality, volume, and consistency are the prime considerations of buyers before making a purchase. Processors and exporters need to meet these requirements to be competitive in the market.

2.4.1 *Virgin coconut oil*

The Philippine VCO value chain is the most competitive globally. This is indicated by its dominance of the world trade of VCO. Philippine DCN-VCO and MSME processor-exporters have the capability to supply quality and competitively priced products at the volume needed by importers. The DCN-VCO processing plants, the major producers of VCO in the country, use modern processing equipment with capacities sufficient to mass produce good quality VCO. Having economies of scale, advance technology in processing and financially capable to support their raw material supply base in terms of embedded technical services, inputs and certifications such as organic, non-GMO and fair-trade, they can competitively price and consistently supply the export market for VCO. Similarly, this is true of a number of medium and small scale VCO enterprises who have adopted the use of centrifuge technology, backward integrated in the production of organic and GAP certified coconut farms and operate processing plants with food safety and traceability certifications.

MSME VCO processors and exporters have progressed in accessing the export market. Enterprises such as Pasiolco, Greenlife, and Treelife that produce multi-products of coconuts have maintained their presence in the US, Europe and Asia-Pacific countries. Using the fermentation method of production which is less capital intensive, they are able to price competitively at the same time produce quality products. According to industry sources, VCO produced by fermentation has better quality than dry pressed VCOs. Using the centrifuge technology they can further enhance quality and improve recovery rate. However, by being relatively expensive it limits the adoption of the technology to a few MSMEs.

An important requirement of the export market is conformance to international standards such as food safety, traceability, environmental sustainability and fair trade. Organic certifications is a must if the VCO is positioned as an organic and healthy product. Certification of this type are the USDA and EU organic certifications. FDA certification is also required to comply with domestic organic certification requirement. Food safety

⁵² Sweet sand is a non-saline sand that is mined from sand dunes.

certifications and traceability includes good manufacturing practice (GMP), good agricultural practice (GAP), hazard analysis and critical control points (HACCP), and ISO. For VCO intended to comply with certain religious sectors' requirements, certifications like Halal and Kosher to satisfy Muslim and Jewish religious laws are needed. Other buyers require fair trade certification which promotes fair prices for farmers, decent working and living conditions for workers, higher income by farmers by bypassing unnecessary middlemen, promotes association of workers and cooperatives and advances sustainable agriculture.

Government through the Department of Agriculture (DA) has been supporting the certification of coconut farms as organic and GAP compliance through the FDA and DOST by subsidizing the cost for three years. It also extends technical services on how to comply with the requirements of the certifying body. In addition, through the KAANIB Enterprise Development Project (KEDP) of the PCA, intercropping and livestock and poultry agribusiness ventures have been encouraged to enhance the viability of coconut farming. These interventions intend to strengthen the supply base of raw materials (i.e., nuts and sap) which generally consists of small fragmented farms. PCA also provides chemical and microbiological analyses of coconut products and by-products services and is responsible for the issuance of export and commodity clearance.

2.4.2 Coconut sugar

The requirements by the market on coco sugar is similar to that of VCO. Likewise the necessary certifications required for food products, for positioning the product as organic and compliant to fair trade and religious laws are the same.

2.4.3 Coco coir/peat

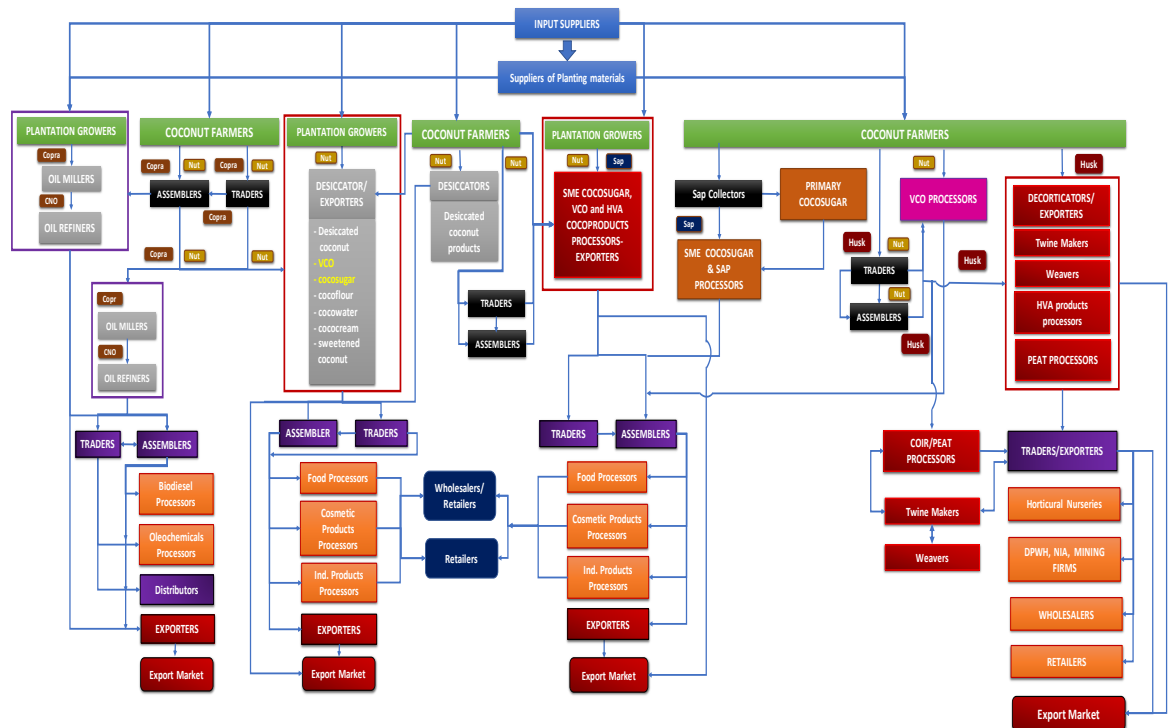
In terms of quality, Philippine coco coir/peat products are competitive in the export market. However, its VC is not competitive in volume because of having relatively small capacity processing plants and in price because of the high cost of production. Industry follows the standards of the PNS for raw and baled coco coir and loose and compacted coco peat.

2.5 Position of the 3NTCPs relative to other coconut products' VC – Philippines

To have a clear picture of the behavior, structure and performance of the 3NTCPs value chain, it is discussed in the context of the industry value chain structure and operating environments. The coconut industry value chain map shows the relative position of the 3NTCPs, their linkages and relationships, with other internal players in the value chain.

The coconut industry value chain (**Figure 6**) illustrates the relative positions of the traditional and the NTCPs. It should be noted however, that processing enterprises produce multi-products, either a set or mix of traditional and non-traditional products. These overlaps and complexity pose difficulty in analyzing the VC from an industrial level.

Figure 6 The relative position of the 3NTCPs in the coconut industry VC



The structure, players and linkages and the dynamics in the industry VC are briefly discussed in the succeeding section. This is then followed by a more detailed analyses of the 3NTCPs' VCs.

Structure, players and linkages

The structure of the VC shows the processes and various players that performs them as well as the linkages that connect these network of players. It also includes the other players external to the chain and the functions that they do.

Traditional products VCs: The traditional products (i.e., CNO, RBD, oleochemicals, DC) enterprises' VCs are the largest and most dominant in the industry VC. Multinational processing VCs are the dominant chains. These VCs both produce and export their products and have processing plants that operate in various parts of the country. This group is highly organized into industry associations that form the core of the United Coconut Association of the Philippines (UCAP).

There are 15 large CNO producers (e.g. Cargill Oil Mills Philippines, Inc., Legaspi Oil Company Inc., Granexport Manufacturing Corporation, etc.) organized as the Philippine Coconut Oil Producers Association, Inc. (PCOPA). Eleven large processing and exporting refiners dominate the coconut oil refining segment. This include among others San Pablo Manufacturing Corporation, Limketkai Manufacturing Inc. and AFTA

Corporation. This group represents the Coconut Oil Refiners Association (CORA). The oleochemical value chain consists of five processors organized as the Philippine Oleochemical Manufacturers Association (POMA). These are Chemrez Technologies Inc., United Coconut Chemicals Inc., Sakamoto Orient Chemicals Corp., Pan Century Surfactants Inc. and JNJ Oleochemicals Incorporated. The desiccated coconut VC is dominated by six large players, Franklin Baker Company of the Philippines, Peter Paul Philippine Corporation, Primex Coco Products Incorporated, Superstar Coconut Products Company Incorporated, Pacific Royal Basic Foods Incorporated and Axelum Resources Corporation. Like the other coconut products processors this group is organized as the Association of Philippine coconut Desiccators (APCD).⁵³

The operations of these coconut oil processing firms cover major coconut producing regions. They operate multi-mills linked with network of traders, traders-assemblers and farmers for the procurement of their raw materials (i.e., copra and husked nuts). The traders-assemblers consolidate the supply of copra for CNO processors and whole husked nuts for desiccators from local traders. The local traders have direct contact with the farmers and usually have established long relationship with them. One assembler with a network of local traders can secure the produce of 150 to 200 farmers. Large assemblers, however, can consolidate the output from more than 2,000 farmers through small assemblers and network of traders. The consolidators contracted by the mills are price setters for both the traders and farmers. Their buying price depends on the buying price of mills based on the international prices of CNOs and/or desiccated coconut.

The processing mills' raw material procurement price hinges on the price of coconut oil in the global market of vegetable and palm oil market. Vegetable oils and palm oil being the major oil traded globally are the main influencers of coco oil price. CNO and its derivatives face stiff competition from these oil products more particularly from palm oil which is a perfect substitute. An oversupply of these products in the market which causes price to drop likewise leads to a fall of CNO.

On the outbound side of the CNO VC, aside from exporting producers they supply the requirements of local refineries, oleochemical plants, and other high value-added coconut products processors and exporters for out-of-country refining. Some of these CNO mills are vertically forward integrated into refining and value-added processing.

In addition to the large producers are the small oil mills with capacities ranging from 30 MT to 130 MT of copra per day. There are about 32 mills of this type in the country with an aggregate capacity of approximately 2,000 MT/day. The mills are dependent on small traders for their supply and from farmers who directly sell their copra to them. The output of these mills are mainly for the domestic market.

Firms that indirectly export make use of brokers such as E.U. Sons Trading Corporation, Eiselgen House of Trade, Manual Igual Inc. and Raco Commodities Philippines Incorporated. These are large and traditional brokers who organized themselves as the Association of Coconut Brokers, Inc. (ACBI).

Another dominant value chain in the traditional products category is the desiccated coconut. Desiccated processing plants produce multi-products from a whole nut. These include low fat desiccated coconut, coconut flour, coconut cream/milk, coconut water, paring cakes and paring oil, and VCO. Some produce charcoal and activated carbon from coconut shells which they also use as fuel for their boilers. Franklin Baker and Superstar Coconut Products Company are two of the large desiccators that produce both desiccated

⁵³ Directory of Coconut Establishments in the Philippines. United Coconut Associations of the Philippines, Inc., Volume 8, number 1. 2018.

and NTCP products. These firms are among the large producers and exporters of coconut water, VCO and coco sugar.

There are 12 desiccator plants spread in four regions, namely, CALABARZON (Region IVA), Bicol Region (Region V), Northern Mindanao (Region X), Davao Region (Region XI) and CARAGA Region. These plants have the potential capacity to produce 830 MT/day of VCO and 1,900 MT/day of coconut water.

Desiccators source their raw materials or husked nuts from farmers who sell to traders and assemblers. This type of raw material cannot be inventoried and is delivered at the soonest possible time after harvest and dehusking from the farm to the processing plants. The nuts shrink about 3.5% in weight for every day that it is not processed.

The NTCP VC: There are several NTCP VCs based on type of products produced. Most of these overlap as enterprises generally produce combination of products. For example some VCO processors produce other products such as coconut flour and VCO based coconut products such as coco jam, coco sugar, soap, coconut water, cosmetics and wellness products. Coco sugar producers also process coconut sap into other products like coco amino, coco honey, vinegar and coco jam and they also produce VCO.

The charcoal and activated carbon, coco coir and coco peat, and coconut flour VCs arise from the processing of coconut byproducts. Charcoal and activated carbon are products of processing coco shells which are by products in the processing of coconut oil and VCO. Coco coir/peat is from the processing of husks these are wastes from dehusking green nuts for copra and desiccated coconut making.

As indicated in the industry VC illustration, NTCPs source both from farmers and their leased and/or contracted farms. VCO processors use whole nuts to get the meat as raw material for processing while coco sugar and other sap-based products processors use sap from unopened flower bunch of the coconut. These two products compete in the use of the coconut tree which is either for nut production or sap extraction. Enterprises that produce these two products source from farmers with nuts and farmer-tappers who collect coconut sap. In the former, processors establish close linkage with farmers through informal and formal supply agreements since producing sap limits their market options. Also processors need to have tight control of the quality hence the production, collection and delivery of sap. For other enterprises leasing farms and sourcing from own farms is a way of having control of sap supply and in getting organic certification of the farms.

Like the traditional coconut products, the markets for NTCPs are domestic and foreign. Processors directly and/or indirectly exports with the latter making use of broker-exporters. Brokers of traditional products also deal with NTCPs.

The processing of byproducts like coconut husks into coco coir and coco peat are mainly done by medium sized processors. The coco coir value addition such as twine, geonets, geologs, mats are passed on to micro- enterprises or village level entrepreneurs though some have in-plant twine making and weaving.

2.6 Overlaps in the VCs

Referring to **Figure 06**, we can see overlaps of VCs in its three main processes. These include sourcing of raw materials, processing and marketing of coconut products.

In the procurement of raw materials or in the inbound chain, processors of traditional (CNO and desiccated coconut) products and NTCPs (VCO, coconut water) use nut as the common raw material. Due to this overlap they compete for the use of nuts. The former

process the meat from the nut into copra while the latter turns it into desiccated coconut. DCN-VCO producers also compete with MSME VCO processors for the nuts. In time when there is shortfall in the supply of nuts and the relative price of nuts rises, the allocation of nuts is biased towards the CNO producers and desiccated coconut processors because of the large volume that they purchase. This leaves MSMEs to go after suppliers offering higher prices just so sufficient nuts are procured for processing. This is one reason why some medium and small VCO MSMEs backward integrates through leased and own farm management and operation.

Aside from the overlap in raw material supply, traditional processors such as coconut desiccators have ventured in the production of NTCPs particularly VCO and coconut flour. Industry sources (i.e., MSME VCO processors, PCA) the large producers now account for about 80% of the total export of VCO. Their recent entry into the coconut sugar market could jack up export volume but could also crowd out MSME processors in the market. However, if they only act as consolidators to supply buyers, then it would be beneficial to MSME producers as market will further expand.

These overlaps have allowed the mainstreaming of VCO, coco sugar, and other non-traditional coco products in export markets. With economies of scale, modern processing facility and existing marketing network traditional-NTCP processors can mass produce the products with quality and competitive price. These have allowed the country to dominate key NTCPs such as VCO and coconut water in the world market. However, a negative consequence is the crowding out of MSMEs in the market. Although there are some enterprises such as Treelife, Pasiolco and Greenlife that have penetrated the export market, competition from traditional-NTCP processing firms constrain MSMEs' expansion and entry into the market.

The in depth analysis and characterization of the value chains follow in the succeeding section. It covers the structure, behavior and performance of each of the 3NTCPs. Value chain maps illustrates their structure showing the vertical linkages, flow of products or marketing channels and other information such as volume and value at each node of the chain.

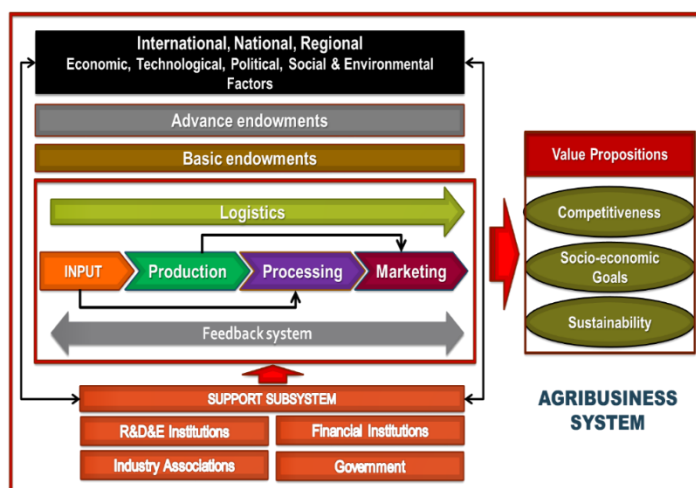
The output from these analyses served as input in the identification of constraints in the VC and the subsequent formulation of recommendations for interventions to address key concerns. The design of the VC business model is then drawn out from the results of these analyses.

3 Value chains analysis in the three non-traditional coconut products

This section analyzes the structure, behavior and performance of the 3NTCP MSME value chains and the constraints of performance. The analyses used secondary (the first report's review of literature and discussion) and primary (the results of the REECS TRAVERA MSMEs', coconut farmers' survey, Davao City validation forum and supplemental KIIs and FGDs undertaken by the External Collaborator) data and information as inputs.

A generic value chain map (**Figure 7**) serves as the framework of the analyses. Indicated in the map, are the processes, key players, linkages and internal and external factors influencing the behavior and performance of the chain. Moreover, it shows the value proposition or the goals of the chain which include not only economic goals (competitiveness, profitability, employment, income) but as well as socio-cultural goals (fair trade, gender equality).

Figure 7 Generic Value Chain Map as Framework for the 3NTCPs VC analysis



ILO Excoll Value Chain and Agribusiness system Model

The analysis is taken from the perspective of MSMEs NTCP processors, the subject of interest of the study. It proceeds with the marketing subsystem or the outbound chain of the enterprise and then moves forward to the processing enterprise and its upstream side or inbound chain. This analytical approach reveals how well the enterprise's VC responds to the requirements of the market and consumers and the constraints that prevent it from achieving its goals.

3.1 The VCO value chain

Figure 8 illustrates the VCO processing enterprises' value chain showing the various processes and key players. The entry point of these value chains are the VCO processors. Reckoned from this perspective, the inbound chain is the procurement of husked coconuts and the outbound chain is the marketing of the finished product.

As indicated in the illustration, there are four types of VCO processors' value chain, to wit, DCN-VCO, MSME VCO processors catering to the domestic market, MSME VCO processors selling to both domestic and export markets and MSME VCO and other coco products processors selling to both domestic and export markets. The dominant VC is the DCN-VCO chain. As earlier mentioned they represent about 80% of the total export of VCO.

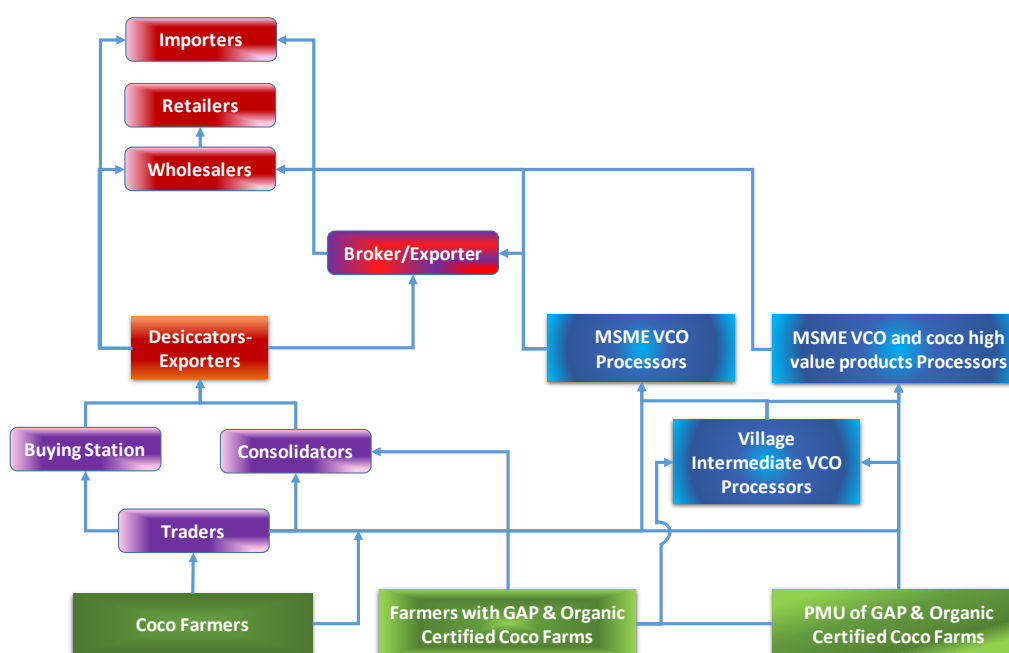


Figure 8 VCO value chain

Although the DCN-VCO value chain is not part of the study, it is briefly discussed in the succeeding section to show their relationship to MSME VCO value chain and their influence on the market.

3.1.1 Desiccated coconut (DCN) - VCO value chain

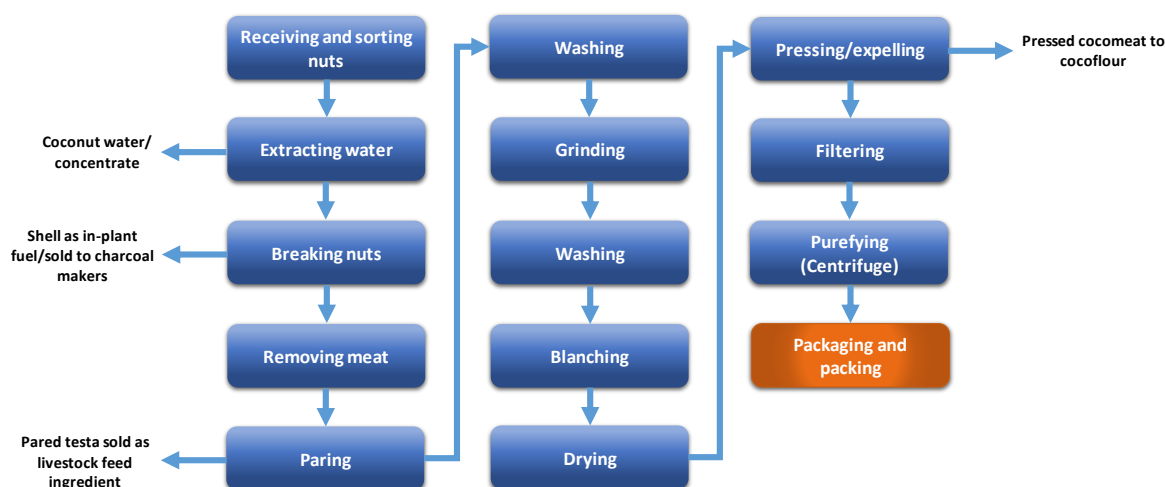
This is the dominant VCO VC accounting for about 80% of VCO export. Most of these processors are large desiccator manufacturers such as Franklin Baker, Primex, Gold Star and Peter Paul. They have the capacity to mass produce conventional VCO from desiccated coconut using the cold dry process. They are export oriented enterprises and directly export to buyers and indirectly export through brokers-exporters. Aside from desiccated coconut products and VCO these VCs also produce coco water, coco flour, coco oil, coco milk and coco cream.

There are 12 desiccated coconut processing plants in the country with the potential capacity to produce 831 MT/day of VCO. These plants have the flexibility to produce desiccated coconut, VCO and other coco product types. This allows them to shift production from one product to another whenever it becomes profitable to produce one than the other.

Value chain processes

Processing: The desiccated coconut (DCN) route of VCO processing uses the dry cold press process which is suited for mass production. The processes are selecting the nuts, cracking, meat removal, paring, washing, grinding, blanching, drying, expelling/pressing, filtering, purifying (centrifuge), and packaging and packing (**Figure 9**).

Figure 9 DCN route of VCO processing



There are three byproducts from this process, the shell which is used as fuel in the processing plant and/or sold to charcoal makers, the pared meat bought by livestock feed makers, the coconut water which is processed as beverage and concentrate, and the pressed meat which the plant processes into flour. The DCN-VCO process dries ground coco meat to a moisture content of 2.5-3% using a mechanical dryer. One dryer type used is a conveyor continuous flow dryer with diminishing drying temperature levels of 100°C, 85°C, and 65°C. The dried meat is stored or inventoried then pressed when needed. A cold press expeller extracts the VCO which then passes through a series of filters to remove impurities and foreign materials. It undergoes further purification through a centrifuge. The final product is packaged for retail in customized packages and in 200 li plastic or steel drums for wholesale. Those that do not pass the standard are downgraded and sold in the domestic market and/or to importers who require low grade VCO.

In addition to dried coco meat as raw material in VCO processing desiccated coconut products, which do not pass the accepted quality standards in terms of color and microbial content, are turned into VCO processing.⁵⁴ It follows the same process as the dried coco meat processing.

This continuous process is highly capital intensive and is an integral part of the overall desiccated coconut processing facility. The processing line technology consists of a mechanized dryer, hydraulic press or expeller, filter system and a series of centrifuge equipment. Continuous highly mechanized cold pressed processing lines have the capacity to mass produce VCO. Because of economies of scale and better processing efficiency (i.e., higher recovery rate) DCN-VCO costs less than the MSMEs' wet process fermented and centrifuged VCO. For example, in the case of Franklin Baker it sells at PhP350 per

⁵⁴ Peter, KV; Alice, K; Bavappa, KVA. Commercial Crops Technology (Horticulture Science Series-8). New India Pub. Agency, 2007 and Bawalan, D. Processing Manual for Virgin Coconut Oil, its Products and By-products for Pacific Island Countries and Territories. New Caledonia Secr Pac Community, 2011, as taken from Gerard G. Dumancas et. al. Vegetable Oil: Properties, Uses, and Benefits - Health Benefits of Virgin Coconut Oil, Brittany Holt Editor, 2016 Nova Science Publishers, Inc.

liter while Pasiolco a small VCO processing enterprise at Tayabas, Quezon sells at PhP450 per liter FOB Manila.⁵⁵

The flexibility of the mill to produce variants of coco products reduces the risk from market failure associated with single product production. The enterprise for example could shift from the more profitable product or products to balance a depressed product. This means that Franklin Baker could shift more production to VCO whenever there is depressed price of or lower return from desiccated coconut and vice versa. Currently the depressed price of nuts which has gone down to a farm gate price of PhP4.50/nut has encouraged more production of VCO. This has however, resulted to an oversupply in the market causing price to drop. Under this situation Franklin Baker could shift to desiccated coconut and other products since they can be inventoried given that the markets are not saturated.

Marketing: The VCO products sold in the domestic and export market vary with quality. The basic standard used is the Philippine National Standard for VCO (PNS/BAFPS 22:2004/ ICS67.2000.10).⁵⁶ The standard however, does not distinguish between organic and non-organic VCOs. Buyers however require additional standards to meet their specific requirements for VCO and the requirements of government.

VCO in the market is classified as organic and nonorganic or conventional, premium, grade AA and A, and reject or low grade. The low grade is used as ingredient in making cosmetics, aromatherapy and soap.

The export markets include countries in the Americas (US, Canada), Europe (Germany, France, UK), Asia-Pacific (Japan, China, South Korea, Singapore, Malaysia) and the Middle East-Africa (UAE). Marketing is through the desiccators' traditional marketing network, B2B marketing, on-line marketing and brokers-exporters who act in behalf of importers.

The price varies with the quality of the VCO and volume purchased. Organic certified VCOs are more expensive by US\$0.50 to US\$1.00 compared to non-certified ordinary VCOs. Centrifuged VCOs organic and nonorganic certified are also priced higher than ordinarily produced VCO. These are marketed as premium or extra pure VCOs. However, a number of buyers are indifferent of the product differentiation which places fermented-centrifuged VCO of MSMEs in a price disadvantage.

Procuring raw materials (husked coconuts): Coconut meat which is the basic raw material in VCO processing comes from fresh coconuts. The nuts are husked or removed of their outer covering (husk) before these are delivered to the desiccators' mills.

The DCN-VCO processing plant uses a network of consolidators, traders, and farmers in procurement. In the case of Franklin Baker its procurement network extends from Quezon to Bicol. It has several strategically located trading or buying stations to reach out to farmers and independent traders for direct delivery. This network directly competes with the coconut procurement network of CNO millers as well as with the MSMEs nut supply procurement.

⁵⁵ Integra Final Report. Value and Supply Chain Assessment for Processed Coconut in the Philippines. March 15, 2017.

⁵⁶ The standard states that VCO is the oil obtained from the fresh, mature kernel (meat) of the coconut by mechanical or natural means, with or without the use of heat, without undergoing chemical refining, bleaching or deodorizing, and which does not lead to the alteration of the nature of the oil.

Desiccators give financial advances to preferred-consolidators so they can provide credit to their trader-agents and farmer suppliers. The larger consolidators of nuts, for example, can turn over five million pesos in advances every two to four days.⁵⁷ This system lets traders to extend loans (interest free and collateral free) to farmers to ensure cornering future deliveries.

The DCN processing plant does not carry inventory of nuts because of shrinkage through time. Roughly the loss per day is 3.5% of the weight of the nut. In addition the quality of coconut water deteriorates. For these reasons the plant only procures what is needed for a particular day's operation.

The consolidators, traders and farmers bear the cost of shrinkage whenever they experience delay in deliveries. The consolidators who are at the end of the processing enterprise's raw material inbound chain bear most of the losses. They have sometimes to wait for days to unload in the processing plant due to queuing when there is an influx of deliveries by suppliers. Aside from shrinkage other losses arise from breakage of nuts. Suppliers sell the rejects in the local market and turn the broken nuts into copra.⁵⁸

Bearing the risk of higher losses in supplying nuts to DCN-VCO processing plants, consolidators get higher margins than the traders and farmers. They have a margin of about PhP2.00/nut which is a peso higher than what the traders are getting. The traders and farmers margin is about PhP1.00/nut (**Figure 10**).

Key players in the VC

There are four key players in the DCN-VCO VC, the DCN-VCO processors, marketing brokers/exporters, and the farmers.

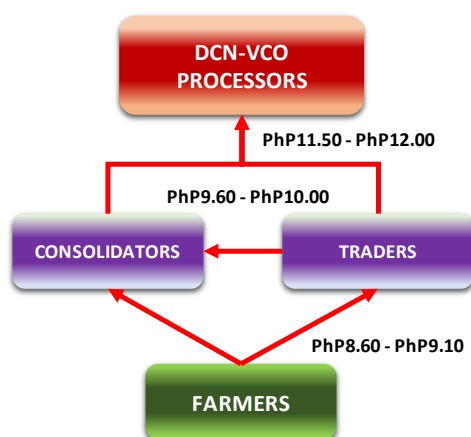


Figure 10 Selling prices and margins in the

companies represent the Association of Philippine Coconut Desiccators (APCD).

DCN-VCO Processors: There are 12 desiccating firms in the country operating in five regions (R-IVA (CALABARZON), R-V (Bicol), R-X (Northern Mindanao), R-XI (Davao), and CARAGA. The processing plants of these firms have the potential to produce about 831 MT/day of VCO. The concentration of capacities which account for 83% of total capacity is in three regions namely CALABARZON (37%), Davao Region (23%) and CARAGA (23%).

The six biggest DCN processing firms are Peter Paul Philippine Corporation, Franklin Baker Company of the Philippines, Primex Coco Products Incorporated, Pacific Royal Basic Foods Incorporated, Superstar Coconut Products Company Incorporated Corporation and Axelum Resources Corporation (formerly Fiesta Brands Inc.). This group of

The firms operate as processors and exporters. They establish strong linkages with their nut suppliers and their buyers from importing countries. The suppliers are networks of consolidators, traders and farmers who are beholden to a particular processor. Advances

⁵⁷ op. cit. Integra.

⁵⁸ Op. cit. Integra,

from the processors flow through the raw material supply chain. At the base of the chain are the farmers who get advances free of interest for future harvests.

Linkages with buyers is through their established marketing network for desiccated coconut products, on-line marketing and brokers/importers who distribute their products to various wholesale and retail networks. Depending on the requirement of the buyers and the target market the packaging of the products are as retail branded, private label and bulk.

Nut Traders: The nut traders are agents of consolidators and also sells directly to MSMEs. They are directly in contact with the farmers and have established long and strong trading relationship with them. This relationship rests on a 'suki' system grounded on trust developed over time and financial advances for household and personal needs. They collect and aggregate the nuts for delivery to consolidators.

Consolidators: They are the DCN-processing firm's preferred integrators who put together the supply of nuts for scheduled processing operations of the plant. They have a network of traders who are deployed in the supply base of the processing plant. The plant provides them with advances which they allocate to their traders for the purchase of nuts in the form of cash payments and advances to farmers for future harvests to ensure continuous supply of raw material for processing.

They compete with CNO processing mills for the nuts. The CNO mills have also their own network of copra consolidators and traders and also adopt the 'suki' practice of raw material procurement.

The consolidators bear the cost of nut shrinkage since they are the ones who deliver the nuts to the plants. The plants only receive what will be processed in a given day and do not inventory nuts for processing to avoid nut shrinkage loss. There are times that consolidators' delivery trucks queue for ten days at processing plants when there is an influx of deliveries.

Farmers: These are farmers with and without landholdings. Some of these farmers are agrarian reform beneficiaries (ARBs).⁵⁹ Of the 3.5 million hectares of coconut farms in the country about 45% are under CARP. The number of ARBs vary with location. In Quezon II, there are 31,574 ARB coconut farmers with an average landholding of 1.75 hectares. They together with other coconut farmers produce copra for oil mills and/or sell nuts to SMSE VCO processors and to traders of consolidators of DCN-VCO. Some of these farmers produce sap instead of nuts for coco sap based processors.

Majority of farmers produce copra for the CNO mills. CNO production has been going on for centuries in the country and a strong relationship have developed over time between traders and farmers and between traders and millers. This has given rise to the 'suki' system where business transaction is not only based on economic gains but also on trust and close informal business relationship. An advantage of farmers producing copra over those selling nuts is they could inventory copra which allows them to take advantage of favorable market prices.

3.1.2 MSME-VCO value chain

The MSME VCO value chain consists of micro, small or medium scale enterprises that produce VCO as a single product or with variants of processed coconut products, procures nuts from farmers and sell its finished products to the domestic and/or export markets. The micro-VCO enterprises usually sell to the local market while the small to

⁵⁹ About 1.578 million hectares of coconut farms are under CARP. In Region IV-A

medium scale enterprises are more export oriented. Their processing plants usually locate at the farm level or at urban centers where utilities are more stable. Unlike the DCN-VCO VC they use the wet process (i.e., fermentation and centrifuge) of producing VCO. These VCs extend throughout the country but are mostly found in Luzon (Regions IVA and V) and Mindanao (Regions X, XI and XII). The procurement of raw materials tap the harvests of independent farmers, farmers who are cooperative members, and internally managed leased farms.

Value chain processes

The processes in the MSME VCO value chain is similar to that of the DCN-VCO value chain. These include the procurement of nuts as source of raw material (i.e., coco meat), the processing of the raw materials into VCO and the marketing of finished products in the domestic and/or export markets. However, the processing technology, raw material supply base and positioning of the products in the market relatively differ.

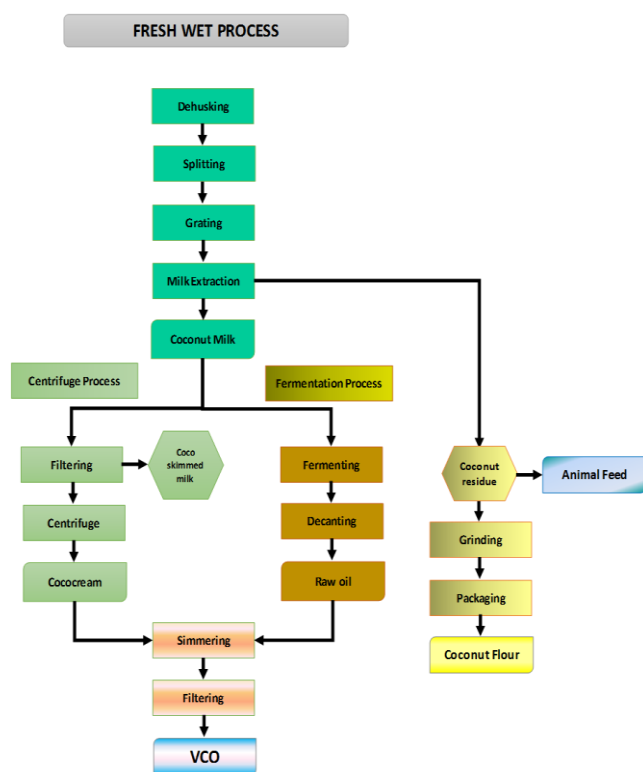


Figure 11 Fresh wet process of VCO production

equipment moves the water to a coco water processing line, high pressure washers clean the pared meat, high volume cutter shreds the meat, automated low heat dryer removes the moisture, hydraulic presses extracts the coco milk, and a series of centrifuge refines the VCO to its purest form.

A key equipment being used by MSME VCO processors with a centralized and integrated processing facility is the centrifuge (**Figure 12**). This could be a single equipment or series of equipment that processes the VCO in its purest form without use of heat. The removal of moisture from cold pressed and fermented VCO through a centrifuge results to more delicious, crystal clear and pure VCO.⁶⁰ The centrifuge VCO extraction

⁶⁰ www.koko.oil, January 17, 2019

process separates coconut oil from coconut cream through a series of high speed centrifuges. This process makes use of washed, blanched, crushed and then pressed coconut meat to produce coconut cream.



Figure 12 VCO centrifuge machines

However, usage is limited to medium and small enterprises who could afford to invest in the equipment. A set of centrifuge equipment depending on capacity and make is priced from US\$3,000.00 to US\$30,000.00 dollars FOB factory. As advertised in Alibaba a centrifuge with the following specifications of 550 kg weight, 930x750mmx1105 mm (LxWxH) dimension, ISO and CE certified and self-cleaning/PLC is priced at US\$16,000.00 to US\$19,800.00/set FOB Port of Dalian or Shanghai.⁶¹ Leyte Koko Oil, AG Pacific Nutraceuticals, Greenlife, Pasiolco and Roxas Sigma Agriventures, Inc. are some of the VCO processors using these equipment.

Marketing: MSME processors rely on business matching events, e-marketing and broker-exporters in marketing their products. Regular buyers are an exemption rather than a rule because of the relatively small production capacity of MSMEs and the competition from DCN-VCO processors.

Pasiolco, Green Life, Celebes and Tree Life are some of those that get assistance from the DTI and DA to participate in international exhibition and market matching events. These include participation in European, US, Japan and Taiwan Food Exhibitions.

Almost all of the surveyed MSME VCO processor-exporters practice e-marketing. They have their own web-sites and are included in e-marketing sites such as Alibaba and Tradekey. Posted in these sites are the background of the company, activities being done, product portfolio, prices, communication information and terms of marketing.

VCO products marketed in the domestic and export markets are of different types intended for specific market segments. There are three broad market segments namely, food, medicine and beauty and cosmetics. This multi-functionality differentiates VCO with other types of vegetable oils (Balwalan, 2011). It has more applications than RBD coconut oil and can be used where crude and RBD coconut oil are traditionally utilized.

Several types of VCO is also being produced which depend on the process and the integrity of raw materials. These products are further categorized as organic and non-organic based on the integrity of the raw materials used. Organic VCOs are certified as such by accredited domestic and international certifying bodies. These are highlighted in retail packaging as certification labels from internationally accredited certifying organizations.

The flow of products for export is through three marketing channels. One is through the VCO processor-exporter by directly exporting the products to importers (brokers/distributors). Another is the trader-exporter marketing channel that include processors-exporters and processors who do not export directly. The last channel is

⁶¹ www.alibaba.com, January 17, 2019

through brokers/exporters who act as agents of distributors/wholesalers and direct users in importing countries.

The TRAVERA survey indicated that quality, price, volume and product consistency are the major factors considered by buyers when they purchase VCO in all product types (**Table 14**). This is consistent with industry standards and for other kinds of products. Depending on the use of the product, quality or price could be the product winner in the decision process of buyers.

Table 14 Factors influencing buyers decision making

Type of Enterprise	Factors influencing buyers' purchasing decision making					
	Price		Vol. Consistency		Qty. Consistency	
	Y	N	Y	N	Y	N
VCO+ value-added	30	3	31	2	31	2
Coco Sugar	9	0	6	3	8	1
Coco coir/peat	22	3	18	7	21	4
Others	31	1	27	5	26	6
Unclassified	1	0	1	0	0	1
TOTAL	93	7	83	17	86	14

Source: TRAVERA Enterprise survey, 2018

Table 15 Differentiation factors influencing buyers' purchasing decision making

Type of Enterprise	Quality and differentiation factors influencing buyers purchasing decision											
	1		2		3		4		5		6	
	Y	N	Y	N	Y	N	Y	N	Y	N	Y	N
VCO+ value-added	32	1	29	4	28	5	23	10	23	10	26	7
Coco Sugar	9	0	9	0	7	2	7	2	6	3	4	5
Coco coir/peat	13	3	13	3	9	7	11	5	10	6	11	5
Others	32	0	29	3	24	8	27	5	28	4	26	6
Unclassified	0	1	0	1	0	1	0	1	0	1	0	1
TOTAL	94	6	87	13	72	28	76	24	73	27	72	28

Legend:

- 1- Product safety and sanitation
- 2- Health benefits/efficacy/content of the product
- 3- International product certifications
- 4- Environmental certifications
- 5- Labour standard compliance certification
- 6- Ethical business practice/fair trade certification

Source: TRAVERA Enterprise survey, 2018

Aside from the other factors influencing buyers purchasing decision making in Table 15, conformance to international standards is an important consideration. This is more pronounced in the VCO value chain (Table 15) since VCO is used for food as well as health purposes.

Pricing depends on the quality, type, packaging and volume of products. On the average the price in 2017 of VCO FOB Manila was US\$2,522/MT (PCA 2017). Koko Oil sets the price of premium VCO from US\$5.50 to US\$6.50 per liter FOB Manila depending on quantity, package size and configuration. The actual price rests on specific requirements of the buyer.⁶² **Figure 13** shows Cocoking's 100% 210 liters packed triple A pure organic VCO product with their prices advertised in Alibaba. Alibaba.com offers 13,449 virgin coconut oil products. About 43% of these are coconut oil, 16% are oil pressers,

and 6% are essential oil. The variants of products expand types as to use, packaging (plastic bottle, drum, and glass bottle), form (virgin, crude, and blended) and color (clear, white, or yellow).

⁶² <https://koko.ph/terms-and-price/> February 4, 2019.

Figure 13 VCO products sold in Alibaba's e-marketing platform



According to Alibaba.com there are 12,818 VCO suppliers in their marketing platform, mainly located in Asia. Most of these are from China (Mainland), India, and Vietnam, which account for 60%, 11%, and 6% of VCO advertisers, respectively. Chinese distributors buy from the Philippines and other VCO producing countries in bulk and/or private labeled which they then market locally and re-export.

With regard to DCN-VCO, MSMEs price higher as their products are positioned as organic VCOs in the market. For example, Pasiolco sets its price higher by US\$0.50 to US\$1.00 at US\$4.00 to US\$4.50 per liter FOB Manila to Franklin Bakers non-organic product at US\$3.50 per liter.⁶³ These are the same as the Fijian VCO pricing to Australia of US\$3.50 per liter for non-

organic and US\$4.00 to US\$4.50 per liter for organic.

Aside from pricing an important part of marketing is the compliance of the products to standard quality specifications and other requirements of buyers and importing countries. The MSMEs not only follow the Philippine National Standard for VCO (PNS/BAFPS 22:2004/ ICS67.2000.10) but also comply with other product attributes (i.e., pH, color, microbial count, etc.) required by the buyers. So far rejection due to quality issues at importing countries has not been a problem. The survey revealed that rejections are more of exceptions rather than a regular occurrence.

Primarily VCO organic certification is important since MSME position their products as organically produced, safe, natural and healthy sweetener. However, the VCO organic market is confronted with hundreds of private sector standards and governmental regulations, two international standards for organic agriculture (Codex Alimentarius and IFOAM⁶⁴) and many certification and accreditation systems.⁶⁵ Organic certification not only from the FDA is required but also certifications from the USDA if export is destined for the US and EU Organic certification if intended for the EU. This multitude of standards, certification requirements and regulations are major obstacles to the MSME VCO organic sector, especially for producers in developing countries.⁶⁶ **Table 16** shows a list of VCO

⁶³ KII with Pasiolco, January 2019.

⁶⁴ The International Federation of Organic Agriculture Movements (IFOAM-Organics International) is the global umbrella organization for the organic agriculture movement representing about 800 members in 117 countries.

⁶⁵ Harmonization and Equivalence in Organic Agriculture, Volume 5, Background Papers of the International Task Force on Harmonization and Equivalence in Organic Agriculture. FAO, UNCTAD, IFOAM. <http://www.fao.org/tempref/docrep/fao/010/ak022e/ak022e.pdf>

⁶⁶ KII with Pasiolco and Green Life, January 2019.

products' international certifications applied for by MSMEs surveyed. The three most popular are HACCP, GMP and organic certifications (Table 16).

Table 16 Product certifications

	Certifications	Number	%
1	HACCP	12	100%
2	ISO	7	58%
3	GMP	12	100%
4	GAP	7	58%
5	Organic	12	100%
6	Fair Trade	3	25%
7	Halal	1	8%
8	JAS	1	8%
		12	

Table 17 Certifications by products types

Particulars	VCO	Coco Sugar	Coco Coir/ Peat	Char-coal	Others
Base – Enterprises	27	19	12	8	25
Certifications	%	%	%	%	%
Organic	70	84	-	-	60
GMP	67	63	33	13	52
HACCP	44	53	-	-	40
GAP	26	26	-	-	20
ISO	22	32	25	13	20
Fair Trade	11	32	8	-	20
Others	15	32	33	13	28

Source: TRAVERA Enterprise Survey (2018)

China, Japan, South Korea, and Taiwan. The enterprises consider China, Japan, USA, South Korea and Europe as their main markets.

In exporting their products MSMEs have to follow certain terms and conditions in export transactions which usually include the following:

1. **Terms of payment:** Either full or installment with down payment.
2. **Mode of payment:** Bank transfer, online payment gateway, cash on delivery, LLC and other types.
3. **Fill order rate:** This specifies the number of days from order to delivery and depends on the distance of the importing country, conditions at the port of exit and entry, and the volume shipped.
4. **Minimum order quantity:** The minimum order that the buyer can buy.
5. **Export price:** Depends on type of VCO, volume, package size and quality.
6. **Export packaging:** Depends on the requirement of the buyer either in bulk, retail packaging and/or private labeling.

The complex certifying process and the cost involved discourage MSMEs from getting these certifications. Pasiolco and Green Life spend more than PhP300, 000.00 for their USDA, EU and JAS organic certifications every year.⁶⁷ Both avail of the services of Control Union, an accredited international certifying organization.

The requirement for product certifications is consistent with the buyers' requirements in purchasing decisions.

Volume is another factor required for an effective marketing. MSMEs and DCN-VCO processors usually produce more VCO when the price of nuts is relatively cheap to build up their inventory in consideration of market prospects. For example, with the current farm gate price of PhP4.50 per nut in Quezon, Pasiolco has gone into full capacity production to produce VCO as well as its other products of coco syrup. This practice however, could lead to an oversupply in the market and eventual reduction in price.

The market destinations for MSMEs VCO products include the USA, the main market, EU countries such as Germany, France and the UK, Middle East and African countries such as UAE, Dubai, Kingdom of Saudi Arabia and Nigeria, and the Asia-Pacific countries such as

⁶⁷ Ibid.

These conditions vary from country to country and include international certifications and other requirements specific to the importing country. For organic products certification, which covers VCO organic products, for the US market a certification from a USDA-Accredited Certifying Agent is needed to declare that the product is organic. In Europe, ECOCERT certification is needed for organic processed and unprocessed products. However, through the US-EU Organic Equivalence Arrangement of June 12, 2012, products certified to the USDA Organic National Program (NOP) Rules can be sold to EU countries without the need for a separate EU certification. Similarly, products certified to the EU Organic Regulation by an EU Accredited Certifying Agent can be sold in the US without the need for a separate US NOP certification.⁶⁸ Products destined to Muslim countries and to Israel, need Halal and Kosher certifications to comply with religious laws and regulations.

Before VCO products can be exported, however, they have to undergo inspection by the PCA for commodity clearance in compliance with Administrative Order No. 01, Series of 2005 of the PCA which is the Implementing Rules and Regulations to Enforce Standards in the Production and Marketing of VCO. It highlights the need for strict compliance to the mandatory quality standard as set by the Philippine National Standard as PNS/BAFS 22:2004, ICS 67.200.10/Amendment 1:2005 and the registration annually with the PCA of producers, processors, traders and exporters of VCO doing business in the Philippines.

Key players in the VC

Processors: The MSME VCO processors produce single product (only VCO) and variants of VCO and other type of processed coconut products. Their capacities are much smaller compared to the DCN-VCO processors. There are more or less 19 PCA accredited enterprise of this type of processors.⁶⁹ About half operates in Region IVA and the other half in Mindanao. The TRAVERA Enterprise survey covering 12 MSME VCO processors-exporters show similar regional distribution pattern but it also indicates the presence of enterprises operating in the Visayas such as in Region VII (**Table 18**).

Table 18 MSMEs VCO processor- exporter by Region

Region	Enterprises	% of total
IVA	5	38%
V	1	8%
VII	2	15%
X	1	8%
XI	2	15%
XII	2	15%
Total	13	1

Source: TRAVERA Enterprise Survey (2018)

The regional distribution shows that 53% operate in Luzon of which 38% are in Region IVA, while 30% and 15% operate in Mindanao and Visayas, respectively. These enterprises are 100% Filipino owned except for Dignity Products and Services Corporation which is 60% Filipino and 40% American owned. This enterprise adopts a social enterprise model that considers social corporate responsibility, empowerment of women, employee stock ownership, profit sharing, training of farmers in organic coconut farming and workers' skills

capability building.

The survey likewise reveals that most of the enterprises are small (46%) and medium (46%) when classified according to their capital assets (**Table 19**). Of the 13 enterprise respondents 1 is micro, 6 are small and 6 are medium. The lone micro enterprise is Kablon Farm of Tupi, South Cotabato. VCO is just a supplement to its main products of processed fruits and vegetables. There are other small and medium enterprises in VCO processing

⁶⁸ www.OrganicSpecialist.com

⁶⁹ PCA 2018.

but were not covered by the survey. These are the Tree Life (North Cotabato), Celebes (Butuan City), Leyte Koko Oil (Leyte) and Superstar Coconut Products Company (Quezon).

Table 19 Type of VCO MSME processor-exporter, REECS survey, 2018

Classification	Total	P-E
Micro (up to P3M)	3	1
Small (P3,000,001 to P15M)	12	6
Medium (P15,000,001 to P100M)	4	6
Unclassified (no information provided)	2	0
TOTAL	21	13

P-E: processor-exporters

Total: includes trader-exporters and exporters

Source: TRAVERA Enterprise Survey (2018)

Some of the processor-exporters like Green Life and Pasiolco depends on intermediate village level VCO processors to supply the intermediate processed VCO for the production of the final products. The intermediate VCO processors are small entrepreneurs who are directly linked with

integrated VCO processors through an informal agreement. They use the fermentation process to produce VCO. In the case of Green Life, two village level processors currently supply intermediate VCO for final processing.

Some of the enterprises are members of industry associations such as the Virgin Coconut Oil Producers and Traders Association of the Philippines (VCOP). This association is a member of the United Coconut Associations of the Philippines, Inc. (UCAP) which is the umbrella organization of the coconut industry. UCAP's core members are the CNO processing firms. The enterprises in bold font in **Table 20** are members of the VCOP.

VCO MSMEs are generally coconut multiproduct producers. The variants of coco products include coco vinegar, coco cream, coco flour, coco jam and coco sugar.⁷⁰ They concentrate their marketing on three to four main products and the rests serve as secondary products. Greenlife for example produces VCO and coco vinegar as main products while Pasiolco has

cocojam as its major product and VCO and coco sugar as its secondary products. Kablon in South Cotabato focuses on processed fruits and regards VCO as a secondary product. By producing variants of products, MSMEs spread marketing risk and have the flexibility to shift production resources from one product to another whichever product has the better opportunity and profitability in the market. The other products serve as a buffer whenever there is a depressed demand of VCO.

⁷⁰ REECS TRAVERA Enterprise Survey, 2018.

Table 20 MSMEs VCO processor-exporter by capital asset classification and product lines

	REGION	ENTERPRISE	CLASSIFICATION BY ASSET	PRODUCTS
1	XII	KABLON FARM FOOD CORPORATION	Micro*	VCO, coco jam and other coconut by-products
2	IVA	GREENLIFE COCONUT PRODUCTS PHILIPPINES INC.	Medium	Extra VCO, 100% organic VCO, organic products: coco sap vinegar, coco gin (lambanog), coco sugar, coco butter, coco syrup, coco jam, coco culinary oil, cosmetic VCO, certified organic MCT oil (has 15 types of coco products)
3	XI	BENEVELLE CORPORATION	Medium*	VCO, coco sugar, coco syrup/nectar, cocot vinegar, coco flakes, coco chips, coco flour
4	IVA	PASCIOLCO AGRIVENTURES	Small*	VCO, coco jam, coco syrup, coco sugar, coco sap vinegar, coco aminos, coco balsamico.
5	IVA	COCOPO COCONUT PRODUCTS	Small**	VCO
6	IVA	COCOPLUS AQUARIAN DEVELOPMENT CORPORATION	Small**	VCO, massage oil, soap
7	IVA, XII	ANDY ALBAO CORPORATION	Medium	VCO (Expeller and centrifuge extracted) and variants (e.g., culinary VCO), coconut and cacao based snack foods, coconut flour, coconut wrap, coconut tortilla, coconut sweetener, coconut based bread spread, and other high value coconut processed products.
8	VII	CARICA HERBAL HEALTH PRODUCTS, INC	Small	VCO, cooking oil
9	XII	ROXAS SIGMA AGRIVENTURES INC.	Medium*	VCO (wet-process centrifuge extracted), coco cream & milk, coco water, aseptic coconut milk & cream in bulk, coco water concentrate.
10	V	DIGNITY PRODUCTS & SERVICES	Small**	VCO
11	VII	SOUTHERN PARTNERS FAIR TRADE CENTER	Small	VCO, coco charcoal
12	XI	AG PACIFIC NUTRACEUTICALS CORPORATION	Medium*	VCO (wet-process centrifuge extracted and cold pressed), coco water, coco flour, coco crisp, coco milk, coco massage oils
13	X	GRAND ASIA INTEGRATED NATURAL COCO PRODUCTS CORPORATION	Small	VCO, desiccated coconut, coco flour,

There are other processors however, that focuses in the production and marketing of VCO only. Cocopo Coconut Products Corporation (CCPC) in Tayabas, Quezon and Dignity Products and Services Inc. (DPSI) in Cagmanaba, Albay are two of these enterprises. They produce raw VCO products and variants of VCO-based high value products. These are differentiated by being positioned as organic products in the market.



Figure 14 Cocopo VCO in bulk of 1,000 li for export
 Source: Cocopo website

Exported products are in the form of branded VCO, privately labeled and bulk (**Figure 14**). The bulk of this export is private labeled. Some of those who export branded products include Green Life, Koko Oil, Tree Life, Andy Albao Corporation and Celebes Corporation. Bulk export is intermittent and irregular. Aside from export these processor-exporters also sell to the domestic market.

Processors differ on the way they procure their raw materials since they produce different kinds of coco products and they vary in capacity. Procurement could be through direct purchases from coconut farmers, traders and from own managed and operated nucleus farms. Greenlife Coconut Products Inc. in Tayabas, Quezon indirectly depends on farmers and its nucleus farm. It does not buy directly nuts from farmers for processing but uses intermediate VCO from VCO village level processors as its raw material. The intermediate VCO processors procure nuts from farmers and Greenlife's nucleus farm. They sell the high grade VCO to Greenlife and the low grade oil in the local market. They earn additional income from the sales of the byproducts (i.e., coco cakes and shells).⁷¹ Refer to **Box 01** for Greenlife's VCO model.

Coconut Farm Supervisors: These are employed by the processors to oversee the management of leased farms from absentee farmers or landholders. These farms are usually GAP and organic certified. They monitor the proper implementation of required cultural management practices and schedule of harvests and delivery to the processing plant.

Farm workers: Farmers and their family members are the usual workers in the coconut farm. They take care of the farm help in the harvesting, collecting and husking of nuts. Additional workers are hired during peak activities such as husking, piling and loading of the nuts.

In the case of MSME enterprises' leased, the farmers who own the land are hired to take care of the farm. The farmer and his family takes care of an assigned area usually one hectare. Family labor supplements the labor hired outside of the farm. This is the same practice in operating own farms of processors. This practice is common in Regions IV-A and V in Luzon as pointed out by the high in-farm source of labor.

Essentially, male workers do the various activities in the farm from cultural management practices to harvesting and post-harvest activities. The activities that are worker intensive are fertilizing, harvesting, collecting and stockpiling, transporting and dehiscing. Women workers are involved in the collection and stockpiling of nuts. The workers either contract the works or are paid by per piece of nut per activity. The sap collectors are paid per liter of sap collected or in a daily rate.

The age of most of the workers ranges from 16 and above. Most of these workers are from the farm and the community. In Region IV the majority of the workers are from coconut farms while in Mindanao the source of workers are from farms and from

⁷¹ Op. cit., MCC-Integra.

neighboring community. In Region X, there are workers who are not residents of the community but are from other communities and provinces.

Farmers: These are farmers who own and leased the land that they are farming. They grow coconut and supply traders with copra and nuts and sell the same products to processors. Some of these farmers are informally contracted by MSME VCO processors as supplier of nuts. Others are hired to work in their own farm leased by the processor. For some, their families stay in the farm to manage assigned areas for coconut production.

The farmers' discussion in this report is mainly based on the TRAVERA Enterprise survey which covered 71 farmers across the country (**Table 21**). This survey consists of 55% farmers in Luzon, 8 % in the Visayas and 36% in Luzon.

Table 21 Distribution of farmers surveyed

Regions	Total
Luzon	39
Visayas	6
Northern Mindanao/ Caraga	8
Davao Region/ Soccsksargen	18
TOTAL	71

Source: TRAVERA Enterprise Survey (2018)

The profile of the farmers show that their average age is 57.6 years old with 71 percent with ages 50 years and older, while 60 years and older account for 40 percent and those below 50 years old represent 27%. This indicates an aging population of farmers and low entry of young farmers. About 70% of the workers are males and the rests are females.

Approximately 70% have 5 or less family members. The farmers have been working on the average for 23 years in their farms. Most (80%) have been working as coconut farmers for more than 10 years while the rest have worked for less than 10 years. This means that farmers have large stock of knowledge in coconut farming and related activities.

Table 22 Farmers highest educational attainment

Educational level	No.	% of total
None	3	4.2%
Primary	24	33.8%
Secondary	18	25.4%
Vocational	5	7.0%
College/University	8	11.3%
Graduate	11	15.5%
No information	2	2.8%
Total	71	100.0%

Source: TRAVERA Enterprise Survey (2018)

Largely, they have attained different levels of education. A third and a quarter of the farmers have elementary and secondary education while about 16 percent have college degrees. Approximately 11% have vocational education (**Table 22**). It is not clear though if the number of farmers with college degrees and with vocational education have been increasing since there are no data available on this information. Moreover, this could imply that farming is just a secondary source of income for this group of farmers. A caveat, the data set is so small and as such, do not represent the population of 3.1 million coconut farmers.

Table 23 Farmers' children education level

Education level	Number	% of total
Primary	7	8%
Elementary	26	28%
Secondary	49	53%
Tertiary	11	12%
Total	43	100%

Source: TRAVERA Enterprise Survey (2018)

As far as the farmers' children education is concerned, about 81% are in elementary and secondary level of education during the time of the survey (**Table 23**). About 12% are in tertiary schooling. These were responses from 39% of the farmers surveyed.

Table 24 Age range and sources of workers in the farm

Age range	≤10	11-15	≥16	NI
IV	0	0	157	4
V	0	4	18	0
VII	0	2	21	1
X	0	0	39	0
XI	3	1	34	0
XII	0	0	22	0
XVI	0	0	6	0
Total	3	7	297	5
Source of labor	Farm	IPs	CMTY	Others
IV	154	0	0	7
V	16	0	0	1
VII	8	2	4	9
X	5	0	24	15
XI	16	4	13	6
XII	8	2	11	2
XVI	0	0	6	0
Total	207	8	58	40

Source: TRAVERA Enterprise Survey (2018)

Farmers involve household members in the operation and management of his/her farm and hire other workers in and outside the community. Most of the family members have ages ranging 16 and higher (**Table 24**). This is common in Region IVA, X and XI. It is also in these Regions that most of the farmers' family members are attending school. This could be a reason why family members are working in the farm. They have to earn to support their education. This could be a sign of a possible depletion of future farmers. With a college degree they tend to move out of the farm to seek better paying blue collar jobs in the domestic job market or work as overseas Filipino workers (OFWs).

Additional help are hired in the harvesting, gathering, dehusking and handling of nuts. The farmers hire directly the workers a number of whom

has worked in the farm for 7 years on the average. They are informally contracted to do the short term jobs and are paid per day, per nut harvested and husked or per set of work done (i.e., pakyaw transaction). A few of the farmers whose family stay in the farm as caretakers involve their children to work such as in gathering and piling the nuts while others just look after them while they are working.

Generally, coconuts farmers depend on their farms as their source of income. The average income is PhP91,000.00 per hectare per year. The farmers from Davao/Socksargen Region registered the highest income of PhP130,000.00 per hectare and the lowest are Visayas farmers who only earn about PhP32,000.00 per hectare per year (**Table 25**)⁷². This could be due to the former practicing intercropping with coconut trees. While the low income of farmers in the Visayas could be explained from the low productivity of coconut trees still recovering from the damage brought by Yolanda. A farmer with one hectare of farm and sells nuts at most could earn PhP40,000.00 per hectare given a yield of 50 nuts per tree, 100 trees per hectare and a price per nut of PhP8.00. At the current farm gate price of PhP4.50/nut the revenue generated per hectare sharply drops to PhP22,500.00 (KII with Pasiolco, Greenlife, Davao validation forum, PCA and other coconut stakeholders, 2018 and 2019). Clearly the first scenario indicates that a farmer should have more than 3 hectares to be above the poverty threshold income⁷³ of PhP108,756⁷⁴. This means that with an average landholding of 1.25 hectares, coconut farmers are earning below the poverty threshold.

⁷² The calculated average income is from sales of copra, husked nuts, sap, shell and husks.

⁷³ Poverty threshold income is the minimum income/expenditure required for a family/individual to meet the basic food and non-food requirements (PSA).

⁷⁴ Poverty threshold income of 2015 (PSA).

Table 25 Average annual income (Php) of farmers from coconut farms and other sources

Sources of Income	Total	Luzon	Visayas	North Minda/ Caraga	Dav/ Soccsk-sargen
Income from coconut farming	91,346	85,541	32,733	78,561	130,000
Income from other farm activities	11,636	5,604	43,067	2,375	16,667
Income from other family members	14,496	-	14,703	32,500	34,941
Income from other sources	73,720	110,777	1,000	42,900	45,778
Base – Total sample of farmers	(71)	(39)	(6)	(8)	(18)

Source: TRAVERA Enterprise Survey (2018)

In spite of the low income from coconut farming, farmers generally intend to continue this type of farm activity. Continuous income from the farm although price is unstable, being source of additional income, and resiliency of the crop are the major reasons cited.

Adoption of intercropping to increase farm income is somewhat low. This could be due to low awareness of the economic benefit, access difficulty and additional cost of adopting the technology. Moreover, there is absence or weak market for the recommended intercrop.

Depending on the buyer the farmers sell their produce as husked nuts and/or copra. Sales are either through informal contracting with traders, formal contract production and spot market transaction. Informal contract with traders is linked with DCN and CNO processors. While formal contract production relates to VCO and other non-traditional coco products processors. Independent farmers practice spot market transaction which allow them to sell more of the product which they find more profitable in the market. From time to time, there are regular buyers of fresh young coconuts who buy in the farm or rely on farmers' delivery.

In a trader-farmer transaction, the trader is responsible for the transport cost. When the farmer delivers to the buyer which is usually the processor, he/she covers the cost of transport. The farmer uses a 'jeepney', tricycle or small truck (i.e., 5 metric ton and less capacity). In the case of VCO processors, the farmer either delivers the nuts and/or the processor picks up the nuts in the farm or designated collection point. The latter is the usual practice since processors coordinate the delivery of nuts to their processing operation schedule.

Price fluctuation and access to buyers are two main concerns faced by farmers when selling their products. This is particularly true when farmers sell through open market transactions. The TRAVERA Enterprise survey indicated that farmers regard low and fluctuating price as their major problem in marketing. As discussed earlier, the demand of CNO and desiccated coconut processors highly influence the price of coconuts in general. When the demand for CNO and desiccated coconut drop the procurement of nuts correspondingly drops resulting to oversupply and consequent falling of price. Farmers who sell to processors and have informal or formal supply arrangement with them on the other hand receive a better and more stable price and assured volume. These type of arrangements have gained ground with the growth of the NTCP subsector particularly the VCO, coco sugar, fresh coconut and coco water industries (**Table 26**).

Table 26 Farmer-buyers marketing arrangements

Marketing arrangement	Number	% of total
Spot market	10	23%
Forward contracting	11	26%
Subcontracting	16	37%
Contract production	2	5%
Others	4	9%
Total	43	100%

Source: TRAVERA Enterprise Survey (2018)

other income sources more than PhP110,000.00 per year. These include remittances from OFW household members, salary received from working in government, and income from entrepreneurial businesses. **Table 27** shows that farming is still the main source of income

Table 27 Farmers sources of income

Sources of income	Number	% of total
Farming	69	97%
Trading	9	13%
Part time jobs	8	11%
Working in other farms	5	7%
Others	11	16%
Total sample farmers	71	

Source: TRAVERA Enterprise Survey (2018)

Farmers also sell coconut byproducts such as husks and shell for additional income. Others turn the shell as charcoal and sell it to wholesalers and to the market. Coconut water is just thrown away as waste in the production of copra.

Income from sources other than farming represents a substantial part of some of farmers' income. These vary with geographical location. However, the survey does not show comparative values because of the low number of respondents. Suffice to say some farmers in Luzon earn from

The farmers could enhance their income by improving farm productivity. Aside from adopting good agricultural management practices (GAP) the use of high yielding and pest and disease resistant varieties contribute to higher productivity. The average yield of coconut farms in the country is about 50 nuts per tree. In some Regions like in Region IV-A yield is as low as 40 nuts per tree. In spite of the availability of better performing superior varieties adoption is quite low.

Farmers have been growing the same tall variety that they have been using since they started coconut farming. They prefer also to use the traditional ones in replanting dead and senile trees. A number of farmers about 70% of those surveyed practice replanting. This is more popular in Luzon and less practiced in Mindanao. The popularity of the 'native' variety over the other varieties are farmers being familiar with the behavior and performance of the tree and these are easily accessible and cost less since these come from their farms and other neighboring farms (**Table 28**). The farmers have been using this variety since they started farming. They are not particular of the variety's yield performance nor its suitability for producing VCO and other NTCPs.

Table 28 Farmers reason for using coconut variety

Reasons for using variety	Number	% of total
Traditional variety	49	87%
Easily accessible	25	44%
Affordable cost	8	14%
Relatively good yield	4	8%
Suited for processing	3	5%
Total respondents	56	

Source: *TRAVERA Enterprise Survey (2018)*

More Luzon coconut farmers practice replanting compared to other farmers in Mindanao. Some of the popular varieties used are Laguna Tall and Pinipog. The others are named locally and most are just referred to as native variety. Farmers on the other hand who are linked with processors have adopted high yielding varieties and dwarf varieties both from domestic sources (i.e., PCA hybrid varieties) and imported from Indonesia and Malaysia. The dwarf varieties promoted by PCA are Galas green dwarf, Tacunan Green

dwarf, and genetically multi-ancestored farmers' Composite Variety'. Some of the farmers who supply Green Life, Pasiolco and Tree Life have planted higher yielding and dwarf varieties. According to Green Life their replanted coconuts have an average yield of 150 nuts per tree which is much higher than the average 50 nuts per tree of old coconut trees. Moreover, for sap based processed coco products the collection of sap is much easier from dwarf varieties compared to the tall ones.

In growing the trees, the farmers practice mainly weeding. Half of the respondents fertilize and 14% control pests and diseases. The higher than expected number of farmers who fertilizer could be attributed to the fertilization program of the PCA. The PCA has been distributing salt fertilizer for free to farmers. However, when the supply of the fertilizer runs out, the farmers do not continue practicing fertilizer application. The survey indicated that there are some farmers who are practicing irrigation. Again these are farmers who are part of the vertically integrated operations of processors. Stock knowledge and technical training and assistance from PCA are the farmers' sources of the technical knowledge and skills development in coconut farming.

Pests and diseases and natural calamities are important concerns of farmers. Pest and disease incidences have been highest in 2015 but gradually declined to the present. The most common ones according to importance are coconut beetle, coco 'lisap' and rats. The incidence however, sharply dropped from 2015 (44%) to 2018 (6%). The farmers also experienced drought and typhoons that have affected the productivity of the trees. These are more common to Mindanao coconut farmers than Luzon farmers.

As far as access to finance is concerned, farmers generally do not tap formal sources such as, government and commercial banks. Most still relies on the advances they receive from traders and from processors for their financial needs to support farm operation and for family expenditures. The requirements of getting a loan from financial institutions and the collateral required turn off farmers from accessing these financial sources. VCO processors and other coconut processors who have established long relationship with farmers extend financial assistance and/or educational support in kind to the farmers' children going to school. This is in kind and in some instances cash.

Trader-exporters and broker-exporters: They are responsible for connecting the processors to and moving their products to export markets. Trader-exporters buy from processors to consolidate deliveries to importers. These are usually the raw VCO which are packed in bulk. The broker-exporters on the other hand link with preferred processors who produce VCO in private label and in bulk. In the private label export the broker-exporter relays to the processor the quality specifications, packaging and packing, certifications, volume and schedule of deliveries required by the buyer.

Aside from VCO the exporters carry other coconut processed products (i.e., coco milk, coco cream, coco water, coco flour, etc.) for export and other agricultural based processed food products (i.e., processed fruits and vegetables) and industrial products (i.e., coco coir, coco peat).

3.1.3 Dynamics in the MSME VCO value chain

There are two marketing channels for VCO. One is through the domestic market and the other is the export market. Based on industry sources and PCA about 70% of VCO flow to export markets with the rest going to the domestic market.

DCN-VCO and MSME VCO processors are the producers of VCO. The former accounts for 80% of export. It directly exports and at the same time uses broker-exporters in entering export markets. The MSMEs do the same but are more highly dependent on doing the export themselves. Small processing capacity limits their ability to transact with more buyers.

Most of the MSME VCO processors are vertically integrated. In the marketing side they directly export VCO and other coco products. Marketing transactions are by business matching, B2B transactions and internet marketing platforms such as Alibaba and Tradekey.

The processing involves intermediate and final processing of VCO. Some enterprises only do the final processing and leaves the intermediate processing to village level processors through formal or informal supply contract arrangement. Other enterprises operates as an integrated processing plant producing different types of processed coconut products. Medium size processors use modern processing equipment and facility to produce the VCO and the other products such as, coconut water and coconut sugar. These facilities have GMP, HACCP and other certifications required by the buyer.

Vertically integrated they produce their own nuts in leased and owned coconut plantations. These farms are usually organic and GAP certified. They assign a farmer and his/her family to take care of a designated farm area and hire additional workers for harvesting and postharvest activities. Aside from leased and owned coconut farms, they also procure nuts from selected farms within the vicinity of the processing plant.

For a more in-depth discussion and analysis of the dynamics in the VCO value chain, refer to the Greenlife VCO value chain mini-case of **Box 01**. The case used secondary and primary information. The latter is through a KII with Mr. Francisco P. Rubio, Manager of Greenlife.

Box 01 Greenlife coconut products philippines Inc. VCO value chain

Greenlife Coconut Products Philippines Inc. is a small-scale enterprise operating at Tayabas Quezon. It produces organic and conventional or non-organic VCO for the domestic and export markets. It also produces other coconut-based products such as coco vinegar, coco sugar and other variants of VCO (i.e., VCO massage oil) and coco sap-based products (i.e., coco amino, coco syrup/honey, coco wine/spirit).

The enterprise's value chain is vertically integrated. The nature of vertical integration is relational rather than full ownership and management of processes in its inbound chain. As shown in **Figure 17**, it mainly consists of the Integrated Processing Plant (IPP) where the products are finally processed, standardized, packaged and packed and inventoried

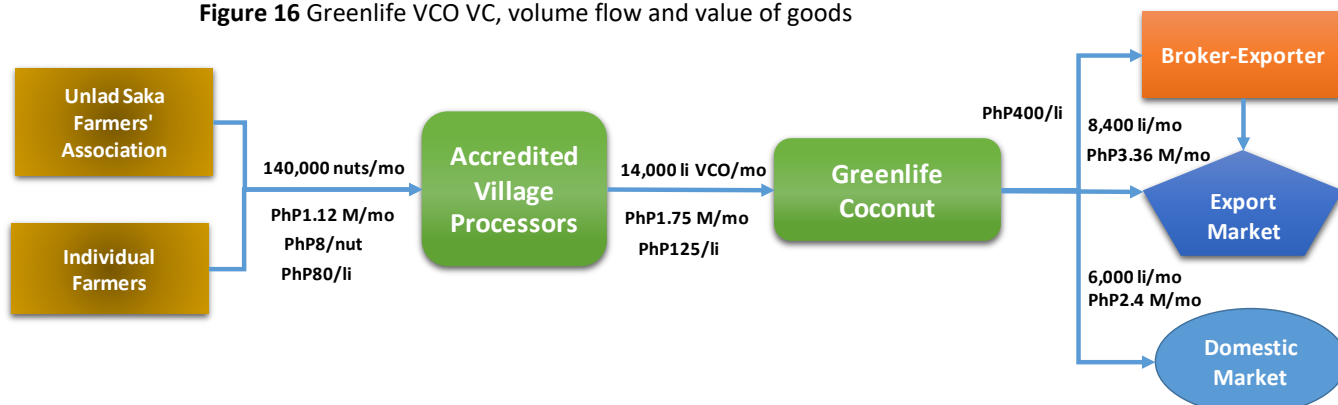


Source: Greenlife power point presentation, Tayabas, Quezon, January 2019.

Figure 15 Greenlife's VCO and coco products value chain

Final Processing: Greenlife has the capacity of producing 14,000 liters per month to 30,000 liters/month of VCO both conventional and organic (**Figure 16**). It has a central processing plant at Tayabas that produces and standardizes variants of VCO. It produces VCOs using the fermentation and wet centrifuge process technology. The latter uses a tubular centrifuge with a capacity of 300 li/day at 8 hours operation per day to purify VCO. This equipment enhances the purity by reducing moisture in the VCO at the minimum level without the use of heat. Moreover, recovery is higher

Figure 16 Greenlife VCO VC, volume flow and value of goods



Source of data and information: KII with Greenlife, January 2019.

compared to the fermentation process. It also operates a cylindrical centrifuge for the production of coconut cream/milk and other coco products.

Greenlife classifies VCO into three grades, A₁, A₂ and A₃. A₁ is the premium organic product coming from standardized fermented-centrifuged VCO. A₂ is the conventional non-organic product while A₃ is the rejects of A₁ and A₂ production. A₁ is food grade while A₂ is for culinary and cosmetics applications. A₃ is for the production of soap and for use as an ordinary coconut oil for cooking and other purposes. A₁ is mainly for export while the other two are for the domestic market. The centrifuge process produces more of the A₁ grade and less of the A₂ and practically nil of A₃. **Figure 17** shows the range of VCO products and other coco products of Greenlife.

Figure 17 Greenlife's range of branded Products for wholesalers and retailers



Intermediate processing: The raw materials for final processing are intermediate VCOs produced by two village level VCO processing plants with informal supply agreements with Greenlife. Originally there were five processor suppliers but three were not able to consistently provide the required VCO and eventually were dropped off. Of the remaining processing plants, one produces VCO by wet centrifuge method and the other by fermentation method. These plants procure their nuts from the 115 hectare organic certified farms of Greenlife.

The nucleus farm consists of enterprise owned and leased farms certified by Control Union an internationally accredited certifying organization as EU organic, USDA organic and JAS organic. On the average the value of the intermediate VCO is PhP1.75 million per month to produce 14,000 liters of standardized VCO. This is based on an average buying price of intermediate VCO of PhP125.00/liter. Greenlife buys the intermediate Centrifuged VCO at PhP130/liter and the fermented VCO at PhP120/li. A backward integration into intermediate VCO processing is in the drawing board to further strengthen its raw material supply base.

Procuring nuts: The field level processors source their nuts from the 115 hectares organic certified farms. The nuts for the conventional VCO come from

non-organic certified farms of independent farmers. Greenlife leases and manages organically and GAP certified coconut farms for their organic products.

The procurement price of the nuts depends on the prevailing market price and fluctuates depending on the buying price of copra traders and desiccated coconut buyers. Given a farm gate price of PhP8.00 per nut and 10 nuts to a liter VCO conversion ratio the total value of the 140,000 nuts to produce 14,000 liters of VCO is PhP1.12 million per month. At the time of the KII the prevailing farm gate price of nuts was PhP4.00 to PhP4.50 per nut and PhP6.00 per nut at the traders' level.

Whenever the price of nuts substantially drops Greenlife like other VCO and other coco products processors take advantage of the low price by buying more than their usual procurement volume. The volume however is limited by its capacity to inventory the finished products and its financial capacity to buy more nuts. This practice usually leads to an oversupply of VCO and consequently leads to price depression. This is the current situation in the coconut industry wherein the farm gate price of nut dropped to PhP4.50 in Quezon and traders' price at PhP6.00 has encouraged the production of more VCO not only in Quezon province but also nationwide. VCOPA attributes the current depressed VCO price in the market from oversupply.

Sales and Marketing: Greenlife sells both to the domestic and export markets. The latter is mainly A₁ grade and organic certified VCO. The greater part of the sales is private label retail packaged VCO. These are regular sales that Greenlife includes in its regular production planning. There is not much bulk and company branded retail products for export. Bulk sales are intermittent and depends on walk-in buyers. The branded product portfolio goes mainly to the domestic market.

Export accounts for about 60% or 8,400 liters of its total VCO production. Based on a 14,000 liters per month production, the value of its export is P3.36 million per month if the average price is PhP400.00 per liter FOB Manila. Greenlife prices its organic VCO at PhP450.00/li and its conventional VCO at PhP350.00/liter.

The present export destinations of Greenlife's VCO are Japan, US and France. On the line are possible sales to Canada and Germany. Expanding its market base is an important concern in expanding current production capacity and

achieving better economies of scale. However, it is struggling to access new markets and facing difficulties in expanding its market base in its present export markets. Although it regularly participates in international food exhibition events and business matching, and has a company web-site these are not sufficient to access desired markets. Greenlife finds it expensive to go into more extensive advertising and promotion and to use e-marketing platforms such as Alibaba and Tradekey. These platforms are online B2B marketplace for global traders to find new business partners and business opportunities.

It faces tough competition from DCN-VCO processors who have better economies of scale and from other VCO processors. Greenlife and other MSME VCO processors price higher by PhP100 per liter at PhP450 than DCN-VCO processors' price of PhP350.00 per liter FOB Manila. Although its product is differentiated as organic and branded as extra VCO (superior quality from fermentation and centrifuge extraction process) a sizable part of the market is still indifferent to the differentiation and as such prefer to buy the cheaper cold press dry process.

Like other coco product processors Greenlife does not rely only on VCO but also on other products such as vinegar, and coco syrup. According to Mr. Rubio, the manager of the enterprise, vinegar is becoming their cash cow since it is generating more revenue than the other products in the domestic and export markets.

3.1.4 Measuring quantity and quality of employment in the value chain

Employment⁷⁵ The employment generated in a particular sector or industry is measured by full time employment (FTE) per unit of output or per unit of resource used. FTE is employment with 8 hours per day working hours and 40 hours per week. The number of working days per year is about 229.

The processes in the VCO VC with the highest employment are farm production of coconut (0.05 FTE/MT) and the processing of coco meat into VCO (0.08 FTE/MT). The total FTE generated per metric ton along the chain is 0.16 (**Table 29**). This estimate is based on VCO being directly processed by a central processing plant.

Table 29 Estimated FTE per MT of VCO

	Activity	PD/MT	FTE/MT
1	Farming	15.74	0.05
2	Harvesting	3.37	0.01
3	Dehusking	3.37	0.01
4	Loading and packing	1.15	0.00
5	Trading	1.15	0.00
6	Processing	25.00	0.08
	Total	49.78	0.15

Assumption: 8,000 liters of coco sap = 1 MT coco sugar

Source: Coconut Industry Value Chain Study, BAR, 2018

There are more FTEs generated in the VCO value chain if there is an intermediate VCO processing at the village level. Workers in the intermediate processing do the tasks of receiving husked nuts, sorting, breaking the nuts, grating, pressing, harvesting the fermented VCO, filtering, packaging and then packing.

The village level processing plant could also produce coconut cream which could be processed into VCO in the central processing plant using the centrifuge method. The central processing plant standardizes the VCO from the fermentation and centrifuge process.

⁷⁵ The measure of employment generation is full time employment (FTE) per metric ton of finished product produced

Enterprises that process the pressed coconut meat grates into coco flour generates further employment in the VC. Coco flour making involves the drying and sieving of the pressed coconut meat from the production of coconut milk and cream.

The coconut production, harvesting and postharvest activities have almost the same number of FTEs generated as the processing. Cultural management activities such as weeding and fertilizing are major activities that need more workers. This is validated by the TRAVERA Enterprise survey which showed that the major cultural management activity in coconut farms is weeding followed by fertilizing. The harvesting and postharvest activities are also major activities that generate high FTEs (**Table 30**).

Table 30 Adoption level of cultural management practices in coconut farms

Farm activities	Yes	% of total	No
1 Fertilizing	29	41%	42
2 Spraying	8	11%	63
3 Weeding	40	56%	31
4 Harvesting	58	82%	13
5 Collecting/piling	52	73%	19
6 Dehusking	46	65%	25
Total respondents		71	

Source: Coconut Industry Value Chain Study, BAR, 2018

At the farm level, the rules and regulations are somewhat informal and varies with type of products and locations. A common hazardous work is the climbing of tall trees since it could lead to accidental falling when conditions, such as strong winds and slippery trunks due to rain, are not suitable for safe climbing.

In 2018, there are about 998 workers employed in VCO processing. More than half are male workers and 42% are female workers. Majority or 55% are regular⁷⁶

employees, while the rest are probationary⁷⁷ (17%), seasonal⁷⁸ (11%), casual⁷⁹ (9%) and contractual⁸⁰ (9%). For the past three years, there has been a decline in the number of persons employed in VCO processing. From 2,753 workers in 2016, the number of persons employed in VCO processing decreased by a substantial number of 1,755 in 2018. However, the decline in the number of hired workers may be attributed to increased efficiency in the workplace and more mechanized VCO processing and more from the reduction of production volume due to decrease in demand from export markets.

The proportion of regular employees to the total number of employees also increased from 50% in 2016 to 55% in 2018 indicating slight improvement in the status of employment of the workers since regular employees are entitled to company benefits. There are also opportunities for women in the workplace as indicated by about 42% of hired women in 2018.

⁷⁶ Regular employees are those whose work is deemed to be necessary to the trade or business of the employer.

⁷⁷ Probationary employees are those whose employment do not exceed 6 months from the date the employee started.

⁷⁸ Seasonal employees are those whose work or service performed are seasonal in nature and the employment is for the duration of the season.

⁷⁹ Casual employees are those engaged to perform an activity not usually necessary or desirable to the course of business of the employer or merely incidental to the business and is hired under the terms of casual employment and for a definite period only.

⁸⁰ Contractual employees are those whose employment have been fixed for a specific term or project or undertaking the completion or termination of which has been determined at the time of the engagement of the employee.

Table 31 Employment in VCO processing by type from 2016-2018, Philippines

Employment Type	2018				2017				2016			
	%	Total	M	F	%	Total	M	F	%	Total	M	F
Regular	55	544	318	226	50	1378	***	***	50	1387	***	***
Probationary	17	173	109	64	41	1112	***	***	41	1116	***	***
Casual	9	87	46	41	2	57	31	26	2	57	31	26
Contractual	9	85	49	36	3	85	49	36	3	85	49	36
Seasonal	11	109	52	57	4	108	51	57	4	108	51	57
Total	100	998	574	424	100	2740	***	***	100	2753	***	***

***no information

Source: Interview from VCO processors

Recruitment. Results of the TRAVERA survey indicate that, as with the other NTCPs, employees in VCO processing are directly recruited by companies through formal recruitment process. VCO processors seldom recruit through informal channels or means (i.e. through farming communities, informal groups of farmers or word of mouth referrals) except for production and processing-related jobs such as packaging, labelling, product development, product design, food safety, etc. and logistics and transportation-related jobs involving delivery of goods, transport of goods, etc.

Nature of work contract. Regardless of the employment type, most or 56% of the VCO processors covered by the TRAVERA survey have formal written contracts with their employees and that these cover 44% of workers in VCO processing. Across the 3 NTCPs, contracted or seasonal workers mostly have work contracts of 5 months and below but with renewal depending on the need of the company. In the TRAVERA survey, 53% of respondents for VCO processing indicate that they regularize their contractual or regular seasonal or informal workers.

Skills and Training. The level of skills needed in the 3NTCP VCs is generally low. The VCO and coco sugar processing use non-automated technology and non-mechanized processes. In the coco coir/peat mechanization skilled workers are needed in the decorticating process and baling. Value addition such as twining and weaving are also mainly manually done but require a relatively higher degree of skills. The same exists in the farm level where cultural management practices, harvesting and postharvest processes are not mechanized. At the farm level the important skills are climbing the coconut trees, harvesting and dehusking. These are manual processes and easily can be learned by workers.

In the processing node the important skills are in the standardization of the finished products, quality control, compliance to food safety, GMP protocols and sustainability rules and regulations and product development. People with these skills are needed to ensure the consistency of product quality, conformance to food safety rules and regulations (GMP, HACCP) and traceability (ISOs). Skills in product development is also important in continuously producing innovative products. Product innovation is one of the determinants of VC competitiveness.

The TRAVERA Enterprise survey indicated that still a number of MSMEs in all the 3 NTCPs consider the skills of their workers in these different processes to be deficient. However, in the VCO VC more enterprises regard their worker skills being sufficient to meet required processing standards. As shown in **Table 32**, skills in quality control and assurance, food safety and handling, and green skills are rated as good to excellent particularly for VCO and not so much for coco sugar. Maybe this could be due to more VCO MSMEs respondents in the survey. Coco coir/peat MSMEs on the other hand emphasizes the skills in operating machineries both automated and non-automated and equipment operation and safety as two important skills that their workers should have. This is due to higher mechanization of processes in this value chain.

Table 32 Level of skills of workers in various processes of MSME VCOs, coco sugar and coco coir/peat

Type of Enterprise	Computer literacy			Green skills			Equipment operation and safety			Operating computerized/automatic machinery			Operating non-computerized/non-automatic machinery			Food safety and handling			Quality control and assurance		
	NG-SG	G-Ex	NA	NG-SG	G-Ex	NA	NG-SG	G-Ex	NA	NG-SG	G-Ex	NA	NG-SG	G-Ex	NA	NG-SG	G-Ex	NA	NG-SG	G-Ex	NA
VCO	11	19	3	9	18	6	5	12	6	5	18	10	24	19	6	9	22	6	4	17	4
Coco Sugar	4	5	-	4	5	-	4	5	-	2	5	0	12	5	-	10	5	0	2	4	-
Coco Coir/peat	9	13	3	9	13	3	3	17	5	8	26	11	13	8	1	-	-	-	4	18	-
Others	8	13	1	10	11	1	4	24	4	3	15	4	6	24	5	-	-	-	5	25	2
TOTAL	32	50	7	32	47	10	16	58	15	18	64	25	55	56	12	19	27	6	15	64	6

NG – not good SG – somewhat good G – good Ex – excellent NA – no answer

Source: TRAVERA Enterprise Survey, 2018

Both the skilled and unskilled workers are hired even without prior work experience. Workers are provided with trainings internally conducted or organized by the companies, trainings sponsored by government, industry association, or academe and trainings provided by outside consultants and/or product supply dealers. Training providers include Department of Science and Technology (DOST), Department of Agriculture (DA), Department of Trade and Industry (DTI), Philippine Trade Training Center (PTTC), Bureau of Food and Drugs (BFAD), Control Union Certification, SGS Philippines, Philippine Coconut Authority (PCA), Department of Environment and Natural Resources (DENR), Peace and Equity Foundation, Technical Education and Skills Development Authority-Agriculture Training Institute (TESDA-ATI), Association of Negros Producers, Negros Oriental Chamber of Commerce, Cebu Chamber of Commerce, and Food and Development Authority (FDA) among others. However, in providing trainings with the workers, the VCO processors experience difficulties due to lack of information on skills training/courses, lack of available/competent skills trainers, low quality of courses being offered/low quality of trainers, difficulty in funding the training, and difficulty in selecting the right people for training.

In the TRAVERA survey, the lack of available or competent skills trainers and the low quality of courses offered or the low quality of trainers were cited by most of the respondents from VCO processing as primary factors that cause them difficulties in providing training to their workers.

Working Conditions. The following section presents the results of the TRAVERA survey relative to inquiries on the working conditions of workers in VCO processing.

Social security coverage. Sixty-nine per cent of respondents among VCO processing enterprises indicated that their workers are registered with the national social security and insurance systems particularly SSS, Philhealth, and Pag-ibig with most of them saying that

all or 100% of their workers, regardless of the status of employment, are registered with the social security agencies.

Compliance to labour standards including on occupational safety and health. Majority of the TRAVERA survey respondents from VCO processing enterprises indicated that they do not face any problems concerning compliance with national labour regulations. In terms of regulations on occupational safety and health, sixty-three percent of the VCO enterprises said that they have fire protection and control measures, sixty-six percent said they have materials handling and storage facilities and fifty percent said they provide personal protective equipment and devices to their workers. The survey respondents, however, seemed to have concerns in complying to other OSH standards such as the setting up of safety and health committees where only 34 percent of respondents said that such measure exist in their enterprise. Similarly, only 28 percent of respondents indicated that they have measures for protection from pesticides and fertilizers. Forty-four percent of VCO processing respondents also stated that their workers have experienced work-related injuries, accidents or illnesses.

Wages and benefits. The wages received by the workers are based on the legally-mandated minimum wage rate in the region where the company/plant is located. Apart from their wages, they also receive benefit packages. Among the benefits commonly received by the workers are bonuses, paid holidays, and social events such as picnics or holiday parties. Other VCO processors also provide disability insurance, discount on products, flexible working hours, health insurance, life insurance, and profit sharing to their employees.

Table __ presents the list of benefits provided to workers in VCO enterprises.

Base: Sample enterprises	(32)
	%
Bonuses	75
Paid holidays	63
Health insurance	41
Flexible working hours or "flexitime"	41
Discount on products	41
Disability insurance	19
Life insurance	16
Profit sharing	19
Others	9
No information	13

Labor relations. Employees in the VCO enterprises are not part of any union or worker's organization and are not covered by Collective Bargaining Agreements (CBAs) with their employers

3.1.5 Constraints in the VCO value chain

There are challenges along the VCO value chain that constrain its performance as an export oriented value chain. The number of jobs, job types, seasonality, and workforce quality along and across the value chain vary with the processes, type of products, technology used, volume handled and type of entrepreneurial activities. How employment generation or job creation and quality of workforce is sustained depends on how well the MSME value chain performs.

Performance is how well an MSME operates and manages its VC functions of processing, marketing and raw material procurement in relation to market requirements and conditions in the operating environment. The latter is highly influenced by external

support functions actions and programs such as that of government, financial institutions, industry associations and R&D&E institutions.

The analysis of these constraints focuses on the MSME VCO processors. It covers the identification of constraints, their causes and effects on the VC's performance. It starts with each VC nodes (i.e., marketing, processing and procuring of raw materials) then proceeds with the integrated internal VC and key external VCs.

Marketing constraints

- 1. Small market base:** VCO is positioned mainly as food supplement in the export market. As a food supplement for health enhancement the market is a niche market. The basic characteristics of a niche market are narrow market base, slow growth rate and high price. Faster growth could only come from expansion in new markets. This is more apparent of organic VCO which MSME processors produce.

There are also other processed agricultural products that could substitute for VCO. These include extra virgin olive oil, sunflower seed oil, grapeseed oil, almond oil, avocado oil, and neem oil. The degree of substitution however, is not known but what is clear that these products compete with VCO in the market since they have similar uses for household as well as the cosmetics and health sector.

Although MSME processors also position VCO as an organic product, major users are indifferent of this product differentiation. A sizable part of the market prefers the conventional or non-organic VCO as indicated by the large market share of DCN-VCO. DCN-VCO processors has the capacity to mass produce and have economies of scale that makes them more price competitive therefore. With these advantages they crowd out the MSMEs in the market. Industry sources indicate that about 80% of VCO export are nonconventional produced by DCN-VCO processors. The dominance of DCN-VCO processors' value chain relegates the MSMEs as market followers.

These constraints are barriers to growth and development of MSME VCO value chains. They slow down the entry of new entrepreneurial VCO enterprises and the expansion of capacity and operation of existing ones. With minimal growth generation of employment will be less, economies of scale is not reached, profitability stagnates and sidelines adoption of improved technology and contribution to economic activity stagnates.

- 2. Access and slow response to market information:** With other similar products competing with VCO in the export market negative feedbacks could be expected. Recently the American Health Association (AHA) released a review of evidence on the connection between saturated fat (which makes up about 85% to 90% of coconut oil) and cardiovascular disease. The industry speculated that the decrease in the volume of export in 2016 and 2017 is mainly due to this public announcement.

The response of the industry is relatively slow and inadequate as there was concerted effort by government and the private sector to address the issue. This is a lingering issue that needs actions from both industry and government.

VCO MSMEs also face inadequate market information that they need to plan their marketing as well as production operations. This is an issue that has been raised in the Excoll's KII of VCO MSMEs in Quezon. Market information on size of market, market segments and their characteristics and behavior, and growth of these markets are useful in planning and targeting market entry points and segments, product development, price setting and volume production.

- 3. Inadequate advertising and promotion:** Faced with financial constraints MSMEs mainly are dependent on business matching in international trade fairs and own web sites in advertising and promoting their VCO products. Participation in international food trade fairs is highly dependent on government support and there is a limit to the number of participants.

These marketing initiatives however, are not sufficient to create enough market awareness of their products. The VCO positioned as an organic supplemental food lacks the necessary promotion and advertising campaign to penetrate the niche market for organic products. For this reason awareness of product differentiation is low. Moreover, there is not enough promotion for industrial use a potential large market for VCO.

Higher use in the industrial sector widens the market base and stabilize demand. Stability in demand creates regular orders that will help processors to adequately plan their production and value chain operations.

This constraint like the first two restrains market growth thus retards MSME VC and industry development. Moreover, it also bound the VC in achieving its socio-economic goals.

- 4. Low awareness and difficulty of complying with FTA requirements:** The level of awareness of MSMEs of free trade agreements (FTAs) is virtually low. Moreover, some of those who are aware do not take advantage of the benefits of the trade agreement.

The red tape in complying with the requirements of the FTA such as the certificate of origin (COO) have discouraged participation of MSMEs. Reduced tariff of exported VCO reduces marketing cost and increases revenue.

- 5. Supply not sufficient to meet large orders:** Inherently with small capacity MSME's cannot meet large orders beyond these capacity. The TRAVERA Enterprise survey revealed that for such large orders MSMEs drop the order since they could not consolidate the product of other processors because of standard variability.

- 6. Difficulty to comply with product certifications:** International certifications of VCO and other food products are requirements in entering the export market. It is also a way of differentiating VCO in the market. Although some of the small and medium enterprises have these certifications (i.e., USDA organic, EU organic, JAS, traceability, ISO, HACCP, etc.) most do not have the financial capacity to pay for the certifications. Government through the DA and DTI extend free FDA organic certification but this is acceptable only in the local market.

Without the necessary certifications VCO exports could not enter the market and could not be differentiated as organic, vegan, GMO free, and fair trade compliant. To be acceptable in countries with Muslim as their dominant religion it has to be Halal certified. Widening the market scope to include Jews will require Kosher certification.

Constraints in processing

In the processing side the MSME VCO processors face several challenges. These include the method of extraction, access to technology, economies of scale and compliance to international certifications and specific requirements of buyers.

- 1. Low efficiency of the wet process of VCO extraction:** The MSMEs use the wet fermentation process and centrifuge process in producing VCO. Although these methods are professed to produce better quality VCO than the dry process, there are several issues related to the process, namely: 1) Lower recovery rate compared to the dry method, 2)

fresh coco meat, the raw material, could not be inventoried since it is highly perishable and therefore, should be processed immediately upon delivery to the processing plant, 3) high shrinkage of nuts if kept unprocessed in the field and/or the laydown area of the processing plant, and 4) the fermentation method of extraction takes a longer time to produce VCO because of its inherent natural biological process and has lower recovery rate than the centrifuge and dry process.

These issues make it more expensive to produce wet processed VCO than dry processed VCO. Although the wet process is regarded to have better quality than dry processed VCO the market does not value this differentiation.

2. **Access to technology:** The centrifuge process is a technology that could improve the production efficiency and is adaptable to MSMSE processors. It is a much faster process and produces better quality VCO than the fermentation and dry process. However, technology access is a problem because of cost. A centrifuge system which is a set of tubular centrifuges could cost as much as US\$30,000.00 and higher which micro and small enterprises find expensive.
3. **Economies of scale:** Economies of scale reduces the cost of production as more products are produced up to a given level. The proportionate saving in costs gained by an increased level of production provides competitive advantage to an enterprise. MSMEs have inherently small capacity and therefore, could not compete with DCN-VCO processors who have economies of scale.
4. **Compliance to international certifications:** Marketing needs certified products to meet the requirements of export markets for organic certified, HACCP or food safety certification, good manufacturing practices (GMP), sustainability certification and fair trade certification. The Halal and Kosher certifications are highly required in the processing of VCO. The constraints in getting these certifications is the cost involved. As noted earlier three certifications will cost more than PhP300,000.00 and this will be renewed ever year. MSMEs also find it difficult to religiously comply with the protocols required of the certifications.
5. **Access to testing laboratories:** The PCA provides laboratory testing services however, it is limited in scope. In some areas MSMEs have access to private laboratories while others have in-house laboratories. However, these are not sufficient to provide accessible testing laboratories to others.

This becomes cumbersome and costly to MSMEs since they have to make testing for every production lot to ensure that quality is maintained. Moreover, there are buyers who need testing of additional VCO property aside from the regular property standards. Without strategically located testing laboratories, getting the results could be significantly delayed thus delaying delivery and in the process increasing the MSMEs' opportunity cost.

Constraints in procurement of raw material/nuts

Raw material procurement is a critical process in the chain. Without nuts there are no fresh meat that could be processed to VCO. Fluctuating prices, varying quality and eroding volume of production are the major constraint of procurement.

- 1. Fluctuating price of nuts:** The price of nuts is highly dependent on the procurement of CNO and DCN processors. Whenever the demand for CNO drops the demand for copra drops and consequently the demand for nuts. This ultimately leads to a drop in the price of nuts.

Since the CNO sector represents 70% of the total procurement of nuts then movement in demand of copra influences the price of nuts. The demand and supply for vegetable and palm oil on the other hand influences the demand for CNO. For example, the depressed demand for CNO has substantially decreased the demand for copra and lowered the farm gate price from PhP8.00 - PhP10.00 in the early part of 2018 to PhP4.00 - PhP4.50 per nut in the late part of 2018 to early part of 2019. On the other hand the devastation of coconut farms in the Visayas due to the Yolanda typhoon in 2015 caused price to rise as supply tightened.

When the price of copra is high farmers tend to produce copra and sell to CNO traders and/or to DCN traders. This crowds out MSMEs from the supply of nuts or end up receiving higher priced nuts than necessary.

- 2. Quality and quality variability:** Quality and standardization are also important concerns. The age of the coconut trees, variety and cultural management practices are factors that influence quality of meat and therefore, the quality and recovery rate of VCO. Majority of farmers still use old varieties with low productivity. Moreover, most of the trees are senile and therefore, yield lower quality and volume of coco meat.

There is also variability in the quality of fermentation processed VCO. The fermented VCO intermediate processors use manual, non-measuring and non-automated technology that lead to product quality variability. There are also more rejects produced from this process. Product variability prevents enterprises from consolidating supply by sourcing from other processors.

- 3. Volume variability and tightening of supply:** The stability of the supply of nuts is another major constraint that has implications on production cost and quality. A tightening of supply causes price of nuts to rise while an oversupply could lead to decline in market price. A shortage in supply leads to under-utilization of processing capacity and therefore, higher cost of production.

The supply of nuts from independent farmers is usually not stable since they give preference to those buyers who could offer the best price for their produce. When the price of copra is high they prefer to produce copra rather than sell nuts or when the desiccators offer a higher price they shift their supply to them.

Unproductive trees also contribute to supply variability and shortage. Moreover, most of the farmers have low productivity and meagerly replant dead and senile trees. There is low adoption of high yielding varieties because of problem of access to planting materials and the cost of replanting. These reduce production per hectare diminishing the income of farmers at the same time increasing the cost of procurement.

The low income from coconut growing is a disincentive for farmers to adopt GAP. Production from coconut alone is also not enough to raise the income of farmers above poverty line. With a yield of 40 to 50 nuts per tree and a planting density of about 100 trees per hectare farmers with an average landholding of 1.25 hectares earn income below the poverty level of PhP108,000.00 from selling nuts. If the price per nut ranges from PhP8.00 to PhP10.00, the earnings per hectare range from PhP32,000 to PhP50,000 per year. Based on the average landholding the farmer earns from PhP40,000 to PhP62,500. This means that a farmer under the given conditions should have 2.2 hectares to 3.4 hectares of land to be above the threshold level of poverty (**Table 35**). Under the same condition the price to be at threshold poverty level is PhP21.00 per nut which is much highly unlikely.

Table 35 Revenues at different landholding situations and threshold landholding level

Particulars	Price per nut (PhP)			
	8		10	
Average yield/tree	40	50	40	50
Revenue/ha	32000.00	40000.00	40000.00	50000.00
Revenue/1.25 ha	40000.00	50000.00	50000.00	62500.00
Threshold landholding	3.4	2.7	2.7	2.2

When farmers go into intercropping income increases substantially and exceeds the poverty threshold level. In spite of these however, there are only a few who adopts the coconut intercropping farm production scheme. This could be attributed to lack of financing

and/or weak information dissemination.

4. **Shrinking pool of ‘mananguetes’ or coconut climbers:** This is an emerging problem that emerged in the TRAVERA Enterprise Davao validation forum and the Excoll KIIs with VCO processors-exporters in Quezon. Lack of climbers sometimes delay the harvesting and delivery of nuts. This in turn delays the set schedule of processing operation and in some instances under capacity operation.
5. **Unstable supply of nuts and price fluctuations:** As discussed in the processing constraint section supply of nuts is a critical part of VCO processing. Refer to the discussion of this item in the previous discussion.

Constraints in support services from external institutions

Key institutions such as R&D&E, finance, and industry associations and government influence how players in the value chain behave, make decisions and interact with other players in the chain in response to market demands and changes. In general, there is much to be desired of the supports and interventions provided by these institutions to MSME value chains in general and MSME VCO value chain in particular.

1. Research and development and extension (R&D&E): Large corporate multinational firms and government are the institutions that have the capability to do R&D. In the former the outputs do not trickle to the industry more particularly to MSMEs. On the other hand government R&D&E focuses on farm production and less on the other parts of the chain like in product development and processing technology generation.

MSMEs rely heavily on government for R&D, technical assistance and technology development. The PCA with four research stations have produced superior coconut hybrids but production and distribution of planting materials is not adequate to address the problem of replanting. The production of planting materials still mainly depends on one nut one planting material production. Using this method will require about 82 million nuts given a reject rate of 10% to replace the 75 million old and unproductive farms in 1.03 million hectares. Replacing these trees in 5 years will require 15 million planting materials and in

10 years 7.5 million planting materials. With limited resources PCA on its own could not generate this volume of seedlings and reach the goal of replanting in 5 years.

Although the DOST-PCAARRD has developed the somatic embryogenesis technology (CSet) that could produce 80-120 seedlings per plumule and has the potential to produce 1,000 or more seedlings per plumule, this has not yet been implemented in commercial scale. PCA has embraced the technology but it still needs to formulate the implementing program. This will take some time considering that it will take more or less five years to produce a transplantable seedling.⁸¹

Process and product development is another area where R&D is wanting. In the Davao City validation forum, MSMEs raised the issue of improved fermentation process to increase the recovery and process rate to improve quality and productivity. Another is the development of MCT processing for MSMEs. According to industry sources, the technology is a 'captured' technology developed by a DCN processing firm through a long process of R&D and investment of million of pesos. However, there are only a few MSMEs that go into product development while others are content to produce raw natural VCO. This limits market expansion and at the same could lead to market share shrinkage as more innovative enterprises introduce new products in the market.

Harvesting nuts is emerging as an important concern in both the collection of nuts and harvesting of sap due to the declining number of 'mananguetes' or climber of coconut trees. Mechanical contraptions that facilitate climbing the trees even by unexperienced workers have been developed in India and Sri Lanka. Japan has a similar technology adaptable in climbing coconut trees. Processor participants in the TRAVERA Enterprise forum in Davao attested that the technology is useful but they consider the price as relatively expensive. A sample equipment was handed to PCA for possible redesign and local fabrication but results have yet to come.

Technology gaps in the VCO value chain are signs of lack of a holistic and integrated approach in R&D&E. Currently several government agencies that conduct research on coconut like the PCA, DA-BAR, DOST-PCAARRD and DTI have their own research program. PCA do internal research in its four research stations and at the same time partner with DA-BAR. It has an R&D program different from DOST-PCAARRD's Coconut Industry Science and Technology Program (ISP). What's more private sector has less involvement in these R&D&E programs.

The linkage between the value chain players and government R&D&E organizations is rather weak. Responses to field and processing nodes problems are not adequately and promptly addressed. An example is the coco-lisap outbreak which took time for the industry to respond due to the absence of a research based value chain response system. Another is the lack of a coordinated industry and government response to the AHA advisory on saturated fats-cardiovascular disease connectivity.

2. Financial support services Farmers and processors have identified access to and inadequate financial services as inadequate. In the former financing is needed in complying with GAP protocols and for expansion of production areas. In the latter, financing is needed to acquire productivity and quality enhancing technologies such as centrifuge equipment and the construction of logistics storage for finished products.

At the farm level, farmers particularly those not under contract arrangement, do not have the financial capability to buy inputs such as fertilizers. Suboptimal utilization of

⁸¹ KII with Dr Edna A. Anit, Assistant Director, Crops Research Division, ISP Manager for Coconut, DOST-PACAARRD, December 2018.

fertilizer lowers yield as well as quality and overall productivity of the farm in the process increasing cost of production.

Although financial institutions such as the Land Bank of the Philippines (LBP) extends loan to the cooperative with low interest rate of 0.7% per annum and cooperatives charged 0.8% interest to farmers still there are low takers. Government has various credit schemes for farmers and entrepreneurs, but still a number of farmers have not availed of these programs. A large number still rely on coconut traders and assemblers for financing since they require no collateral and there are no paper works to fill up.

Access to finance also constrains farmers operating independently or through their cooperatives from vertical forward integration into postharvest processing. The high costs of machinery and operating capital have discouraged farmers to go into forward integration. Existing postharvest processing centers also are short of financial assistance to upgrade their machineries and develop facilities to improve productivity and increase warehousing capability. Investment in centrifuge equipment for example is important in improving the quality of VCOs and productivity of MSME VCO processing plants. However, only a few invest in such a technology.

Lack of financial incentive could be another reason why MSME VCO processors do not invest in this technology. The market does not necessarily pay premium for centrifuged VCO.

3. Limited interventions of industry associations in sector development: Industry associations play an important role in providing the platform for consolidated export, industry advertising and promotion, R&D&E and policy advocacy. How each MSME value chain performs depends on how well the industry value chain strands move forward together. These mean working together to meet market demands, to generate technology and technical services to improve processing as well as raw material supply base operations and to advocate for government policies to facilitate a business environment that favors the development of a competitive VCO value chain.

The VCO industry association is the Virgin Coconut Oil Producers and Traders Association of the Philippines (VCOP). It is one of the member associations of the United Coconut Association of the Philippines. These associations promote policy advocacy and partner with government in participating in marketing events, technology generation and technical services extension, and information dissemination.

The focus, however, is on policy advocacy and less of the other activities. They do not have a continuous program in place for collective marketing of their products nor, they conduct market researches to get a better understanding of target markets. There is no industry R&D&E program to address pressing technical and technological issues and problems in the field. More importantly, although there is an existing communication system for information dissemination the associations have not fully leveraged the benefits provided by the digital and internet technology.

4. Inadequate government support services: The government through the PCA and its other agencies have provided wide range of support to the industry. The PCA has been in the forefront of the coconut industry's development as an export oriented industry. However, much is still to be desired for its support to NTCP value chains. As far as VCO is concerned it has to improve its interventions in the R&D&E, financing and marketing support and services. Discussing the role of government, evaluating its contributions and identifying major gaps to be addressed is a major undertaking that requires more in depth analyses and as such, requires a separate study.

Some of these gaps which are major concerns in the VCO value chains and industry include the following:

1. Lack of long term, integrated and holistic R&D&E. This is particularly in the processing node of the 3NTCP VC and the NTCP value chains in general.
2. Inadequate support for MSMEs in accessing export markets and linking with importers.
3. Insufficient generation and dissemination of market information.
4. Inadequate support to MSMEs in getting international food certification and other types of certifications required by importing countries.
5. PCA product analysis and testing centers are not sufficient to meet the requirements of processors.
6. Inadequate incentives for farmers to go into forward integration into VCO processing.
7. Replanting program not fast enough to achieve its target rate of replanting in 5 years.
8. Non-involvement of the private sector in speeding up the replanting program.

In the survey (**Table 36**) about a third of the respondents indicated receiving government services. Coco sugar has the highest response at 68% since it is considered as a priority subsector by the PCA and the DA. However, in terms of specifics the VCO respondents showed more government services received (**Table 37**)⁸². About 30% of the VCO and coco sugar respondents cited market linking as the major services they received. As noted in this report, the DA and DTI provide market linking services to 3NTCP MSMEs through B2B linkages in international food trade exhibitions and other subsector related international trade events.

Table 36 NTCP MSMEs enjoying particular benefits from government (% of base respondents)

Particulars	Total	VCO	Coco Sugar	Coco Coir/ Peat	Others
Government services	30%	47%	68%	14%	27%
Minimum wage law exemption	18%	19%	16%	24%	13%
Fiscal incentives	17%	19%	21%	24%	18%
Other benefits	6%	3%	5%	7%	10%
NONE	18%	13%	11%	24%	20%
Refused/ don't know	22%	19%	11%	17%	25%
Base – Sample enterprise	100	32	19	29	60

Source: TRAVERA Enterprise Survey, 2018

⁸² The number of respondents dropped to 31 from 100 when asked about the specific services received from government and other insitutions.

Table 37 Support services availed of by NTCP MSMEs from various institutions (% of number of respondents)

Particulars	Total	VCO	SUGAR	COIR	Others
Buyer-seller linkage	26	33	27	13	26
Technology transfer	19	0	9	38	25
Training/technical assistance	19	33	18	13	25
Financial assistance	10	0	9	13	13
No information	26	33	36	25	13
TOTAL	100	100	100	100	100
Base Enterprise (Number)	31	3	11	8	9

Source: TRAVERA Enterprise Survey, 2018

3.1.6 Practical recommendations

Although the Philippines is the leader in the production and export of VCO in the global market it faces several lingering and emerging challenges to its value chain that impact on its ability to maintain this leadership. It has to maintain and continuously improve the level of competitiveness of the industry value chains and more importantly of MSMEs. However, to achieve these goals the industry as a whole and the other VC players, both internal and external, should work together to address the strategic and operational constraints identified in the previous section.

The recommendations start with interventions directed to the gaps identified in the three value chain nodes and then followed by the designed workable value chain model. The first part proceeds from the downstream chain and ends up with the upstream chain. The recommended interventions also take note of implications to employment and quality of work.

Marketing: Constraints in marketing prevents access to lucrative markets, creation of stable markets and development of a wider market base. **Table 38** shows the recommended interventions to address the constraints and the expected output.

Table 38 Recommended interventions to address marketing concerns in the VCO-VC, expected output and impact on employment and quality of work.

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Small market base.	Diversify to other markets particularly by accessing other countries, promoting more uses other than food such as for industrial application and introducing new products such as MCT from VCO.	Wider market base due to a diversified market and introduction of new products. This reduces marketing risk inherent of a narrow market.	Diversification widens the market base and consequently increases demand and the needed supply. This will generate more employment directly and indirectly as existing enterprises expand their capacities, new entrants enter the value chain to take advantage of higher demand and more stable market and the raw material supply base reacts accordingly to meet the growing demand.
2. Access and slow response to	Industry associations (VCOP and UCAP) in partnership with government (PCA and DTI) set up an information management	A market information system accessible to industry players to facilitate enterprise value chain	An MIS requires more technical adept workers to operate the system. This not only add quality work to

market information.	system that generates, monitor and disseminate market information as well as link industry key players to markets, research institutions and other VC support service providers.	decision making and government policy making.	the processing enterprise but as well as to other key players in the VC such as third logistics service providers (3LSPs) and intermediate processing plants, production farms and target market segments or buyers.
3. Inadequate promotion and advertising.	Industry associations work together with government in stepping up the promotion and advertising of VCO and VCO variant products to existing markets and potential markets. This includes more market matching and B2B interactions through international exhibition events and e-marketing platforms. Moreover, it could also enhance product differentiation and use to effectively counter negative information such as the AHA advisory.	A long term and continuous advertising and communication program that leverages the digital and internet technology and global market events for market information communication and linking with buyers. An integrated advertising and promotion program allows entry to markets as an industry rather than as individual enterprises.	An effective promotion and advertising program increases the market base which generates higher demand and the resulting expansion of the VC operations. As operation expands more workers are needed to support higher production.
4. Low awareness and difficulty of complying with FTA requirements	VCOP and UCAP advocate for the easing of rules of origin (ROOs) compliance and administration. The Philippine Institute for Development Studies (PIDS) recommends reforms towards electronic Certificates of Origin (COOs) and self-certification, and linkage to the national single window (NSW) which will improve timelines and ease the entry of MSMEs.	A reformed ROO, electronic COOs and linkage to the NSW that facilitates participation of MSMEs in FTA agreements.	Taking advantage of the benefits of FTAs improves the profitability of exporting MSMEs. Better and sustained profitability provide opportunities for growth and sustainable agribusiness operation. Again with growth or enterprise operation expansion there is more employment generation.
5. Supply not sufficient to meet large orders.	<p>Standardization of VCO products to allow consolidation of supply to meet large volume orders. Support the adoption of the centrifuge technology. Adopt a central processing center like Greenfield's and Pasiolco's operations that further processes the VCO for standardization.</p> <p>More output and better quality VCO results from the centrifuge. Village level processors could produce intermediate VCO for the final processors. A network of village processors could scale up the operations by using large capacity centrifuge equipment in a centralized location.</p> <p>This model not only enhances economies of scale but also draws in entrepreneurs and farmers in value addition and the main stream market. Government could provide</p>	Standardized products that allow consolidated supply to meet large orders. Enhanced economies of scale through a network of village level VCO processors. Farmers vertically forward integrate into VCO production increasing their income and generating more employment.	<p>Aside from meeting large orders beyond the capacity of a single enterprise, the ability to consolidate supply draws in small processors within the main stream export market.</p> <p>Intermediate processing generates more employment at the rural level since the processing facilities operate at the farm level. The more network of intermediate processors a VCO processing has the more employment is generated.</p> <p>Quality of work is enhanced at these intermediate processing centers since they are part of the exporting enterprise's VC.</p>

	support to farmer forward integrators through technology assistant similar to the DTI program's technology assistance project for coco coir/peat processors.		
6. Difficulty in complying with product certifications.	<p>Government provide incentives to MSMEs in the form of financial assistance for getting international organic certifications (USDA and EU), JAS, traceability (NOS, ISO) food safety (HACCP, GAP, GMP), fair trade and environmental sustainability. In addition, it could provide technical assistance in compliance to the protocols of these standards.</p> <p>Government through the PCA and DOST could work together with the VCOP in crafting and implementing a medium to long term standardization and certification that differentiates organic and non-organic and grades VCO as to quality. Organic certification and grading are bases for product differentiation and price setting.</p>	Program on food safety, fair trade, sustainability compliant with international standards. More certified MSMEs for export market.	<p>Product certifications for HACCP, traceability, fair trade, global GAP and GMP requires the institutionalization of processes that conform to the requirements of these certifications like adoption of quality of work protocols and non-employment of children.</p> <p>Compliance with the protocols require enterprises to hire quality control people along its value chain. These are regular positions, higher paying work and higher technical expertise work level.</p>
7. High market risk from a single product.	<p>Multiproduct processing to distribute the risk of VCO market depression. These products include variants of VCO products, coco flour, coco sugar, coco jam, coco milk, etc.</p> <p>The ground coconut meat from the production of VCO can be processed into coco flour instead of being sold as animal feed ingredient or just being thrown away as waste. It is a good substitute for wheat flour and supplements the income from VCO.</p>	Diversified coco products with VCO as the main product. Production of coco flour as by product from VCO processing. Additional income to MSMEs.	<p>Multiproduct processing not only spreads out manufacturing risk but also generates more employment and higher quality level of work.</p> <p>This would require hiring product development people and hiring R&D personnel or linking with research institutions.</p> <p>There is also a spillover effect to other agricultural and agribusiness subsectors with the use of different types of ingredients for product variants.</p>

Processing: Constraints in the processing node prevents the value chain in meeting market requirements and in adequately responding to market changes. These include technology gaps, access to technology, economies of scale and compliance to international certifications and specific requirements of buyers. **Table 39** shows the interventions to the identified gaps and expected outputs.

Table 39 Recommended interventions to address VCO-VC processing concerns, expected output and impact on employment and quality of work

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Low recovery rate of the wet process of VCO extraction.	VCOP and UCAP collaborate with government in undertaking research on enhancing the fermentation process for higher recovery rate and better quality. Academic research institutions could establish research partnership with international research groups for this research and other coconut technology and technical concerns. PCA promote the distribution of high yielding varieties such as the PCA 15-2 (Malayan red dwarf x Tagnanan), PCA 15-1 (Catigan x Laguna tall) and PCA 15-9 (Tacunan x Tagnanan). These varieties are outstanding producers of VCO and coco sap and bears fruits as early as 2.5 to 3 years which is much earlier than the 7 year fruiting age of traditional varieties.	Innovative fermentation process with higher VCO recovery rate and adoption of new varieties with higher VCO recovery.	Higher productivity rate from better technology adoption increases intermediate product output for further processing. A higher production volume will require more workers to handle and process the product.
2. Access to centrifuge technology.	Government to provide incentives to MSMEs in adopting and investing in centrifuge process of VCO extraction. Special credit facilities could be formulated towards this end.	More utilization of the centrifuge technology by MSMEs increases production efficiency and enhances VCO quality.	The centrifuge technology increases output and allows for consolidation of intermediate raw materials for final processing. This would generate more intermediate processing centers and therefore, create more employment.
3. Economies of scale	Promote the village level intermediate processing of VCO linked to an integrated processing center. Farmers could forward integrate to value addition and micro-and small entrepreneurs could participate as intermediate processors. The integrated processing center will consolidate, further process and standardize the raw VCO using the centrifuge process. The use of high capacity centrifuge creates economies of scale in production.	Central processing center using high capacity centrifuge system that creates economies of scale and micro- and small enterprises that supply intermediate VCO.	Economies of scale means higher processing capacity. This generates more employment along the chain.
4. Compliance to international certifications.	Government through the PCA and DOST provide technical assistance in complying with international certifications. Financial assistance could be integrated with a technology assistance package that will encourage micro- and small-enterprises to be certified for export.	More MSMEs are certified for food regulation compliance and other certifications needed to enter export markets.	International certifications require that quality of work to be in place in the production as well as the value chain of the exporting enterprise.

5. Access to testing laboratories.	PCA establish more strategically located laboratory testing centers to facilitate access and reduce cost of testing. PCA accredit private testing laboratories accessible to processors and exporters.	Strategically located laboratory testing centers for VCO and other coconut products.	Generates more employment along the value chain from new strategically located testing laboratories.
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Procuring raw materials: There are two perspectives in the procurement of raw materials, one is from the point of view of enterprises that uses intermediate processed VCO and the other is from enterprises that use fresh coco meat from nuts. Procurement of raw materials is a crucial process in the value chain. The cost, quality and volume available impact on the quality, price competitiveness and ability of the enterprise to consistently meet the demands of its market. There are several constraints however, that prevents an MSME to achieve these goals. These include instability of price, quality variability, low productivity, shrinking pool of coconut harvesters and stability of supply. **Table 40** summarizes the constraints, recommendations and expected outputs.

Table 40 Recommended interventions to address VCO-VC procurement of raw materials concerns, expected output and impact on employment and quality of work

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Fluctuating price constraints planning of processing operations leading to higher costs and underproduction.	VCO central processors backward integrate to intermediate processing and management of certified coconut farms. This could be through relational integration using formal or informal contract arrangements and/or operate own intermediate VCO processing plants and coconut farms. The contract arrangement sets the setting mechanism for a fair price.	Vertically integrated MSMEs to stabilize price of raw materials.	Production clusters that are globally GAP certified adopt quality of work practices. Contract arrangement ensures conformance to GAP practices. Farmers and other farm workers have to undergo training for this purpose. This type of arrangement stabilizes prices and the processes along the chain which facilitates the hiring of workers and standardizes work processes which betters work quality.
2. Quality variability of intermediate VCO and nuts.	Processors need certifications for food safety compliance and for other compliance to regulations of buyers and importing country. MSMEs vertically integrate and set up a project management unit to supervise the implementation of protocols relevant to the certifications (organic, GAP, fair trade) acquired as well as schedule the village level production and harvesting of nuts in accordance with the operation of the integrated processing center. The PMU will also monitor the village level intermediate VCO processing for quality and	Assured quality in conformance of international certifications such as HACCP, USDA organic, Europe organic, JAS, and others. Certified value chain that covers farm production of nuts, intermediate processing of VCO, final processing/standardization and marketing and handling.	Global Gap certification of supply base incorporate good quality work practices in production as well as in postharvest activities. Quality control monitoring ensures adherence to these protocols. Employment contribution is through hiring PMU people to manage and monitor supply base operation both from nucleus and outsourced farms.

	conformance to certification protocols.		
3. Volume variability and tightening of supply due to productivity issues.	<p>Backward vertical integration of MSMEs with embedded technical services for farmers (GAP) to improve productivity and with assistance in replanting with high yielding varieties.</p> <p>At the intermediate VCO processing level, intervention should be done to improve the fermentation process to improve recovery rate and quality. One is through R&D on improving the fermentation process to have improved yield and quality the other is to facilitate the adoption of varieties with high VCO yield.</p> <p>Government should lead in the research through in-house or collaborative research with academic and industry research units.</p> <p>At the farm level, PCA should accelerate its replanting program by accrediting private coconut planting materials nurseries, increase its capability to produce more planting materials and by facilitating the implementation of the somatic embryogenesis technology for more production of planting materials. It has also to step up its awareness and adoption initiative for intercropping to encourage farmers to continue coconut production and to adopt GAP.</p>	<p>Farms with higher productivity from replanted high yielding varieties and from adoption of GAP. Technology that enhances recovery rate and quality of VCO. More private nurseries participate in the production and distribution of improved variety planting materials.</p>	<p>Improved productivity means more nuts to be harvested and handled and therefore, in general requires more workers per unit coconut farm area.</p> <p>More participation by the private sector in coconut nursery operation and management increases rural area employment.</p>
4. Shrinking pool of 'mananguetes' or coconut tree climbers.	<p>Adopt mechanical equipment that ease climbing for non-experienced climbers and reduce the risk of accident in harvesting tall coconut trees. PCA to widen its scope of coverage for training 'mananguetes' and including other skills in processing to encourage entrepreneurship among out of school youths.</p> <p>Planting dwarf varieties to facilitate harvesting and increase yield per hectare. Dwarf varieties yield range from 15,000 to 25,000 nuts per hectare which is higher than the 7,500 nuts to 17,000 nuts per hectare yield of tall varieties.</p>	<p>Mechanical climbing equipment that facilitate harvesting even during rainy days and allow more workers to be tapped as harvesters. Trained out of school youths as 'mananguetes' and entrepreneurs.</p> <p>Dwarf varieties as planting materials in new planting and replacement of dead and senile trees that facilitate harvesting and improves productivity.</p>	<p>The use of mechanical climbing equipment which is common in Sri Lanka and India widens the base of workers for harvesting. Women could even use the device to climb the tree and harvest the nuts and/or sap.</p> <p>Moreover, the equipment reduces the hazard of accident while climbing particularly during weather conditions.</p>
5. Unstable supply of nuts	Same recommendation as in the processing section.	Same outputs as in the processing section	Stability of supply leads to better production planning that

and price fluctuation.			<p>includes not only raw material procurement scheduling but also planning for workers needed during the production/processing cycle.</p> <p>When adopting a constant production strategy⁸³, the enterprise besides planning for constant supply of nuts has to plan for the type and number of non-regular workers to hire. In the chase type production strategy⁸⁴ the enterprise has to plan to hire workers according to the demand pattern with valleys and peaks.</p>
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Support services from external institutions

External institutions who provide support services are important in creating a favorable operating environment for MSMEs. There are however, gaps in providing the vital services in R&D&E, financing, logistics and policy formulation. **Table 41** shows the central issues that should be addressed and the corresponding interventions and resulting outputs.

Table 41 Recommended interventions to address gaps in VC support services, expected outputs and impact on employment and quality of work

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Inadequate R&D&E services	PCA should highlight in its roadmap the importance of R&D&E in maintaining the leadership of the country in the NTCPs and in developing further this sector. It should lead the development of a strategic R&D&E program that harnesses the capability of other research institutions such as academic institutions, other government research agencies such as Philippine Center for Postharvest Development and Mechanization (PhilMech), DOST-PCAARRD, BAR, and private sector research centers. R&D&E program should target products with potential such as the VCO, coco sugar, coco water, coco coir/peat and others. India has its Central Coir Research Institute and National	An integrated and holistic R&D&E program that supports the development of NTCP products with high potential for growth and development participated in by government, academic institutions and private research groups collaborating with international research institutions.	<p>Technology development, generation and adoption increased productivity and the competitiveness of MSME processing value chains. Competitiveness breeds growth and therefore, the generation of more employment across the chain.</p> <p>Employment is also generated in the R&D&E sector as activities in this sector intensify. This generate better quality of work for technical people.</p>

⁸³ Constant production has uniform number of production volume per production period such as per month basis.

⁸⁴ Chase type production strategy produces depending on the required demand per production period, say per month. There is variability in production volume per period in this case.

	<p>Coir Training and Design Center to support the technological and technical requirements of this sector. A sector focused research will advance its development and competitiveness.</p> <p>More collaborative researches with international research institutions such as the Australian Center for International Agricultural Research (ACIAR), International Development Center (IDRC) of Canada, coconut research centers of India, Sri Lanka and Thailand, and others.</p>		
2. Inadequate financing support services.	<p>Backward vertical integration with farmer's association such as the Unlad Saka of Greenlife. Processor finances production inputs as financing in kind and extend embedded technical services.</p> <p>PCA develops a financing scheme that provide financial incentive in technology adoption enhancement. Financing support to farmers for GAP compliance could be coursed through processors who have formal/informal supply agreements with farmers.</p> <p>Farmers as co-investors in a processing and farm production scheme. The Land Bank proposed financing scheme could be adopted.</p>	<p>Embedded financing and technical services to farmers with contract agreement with processors. Financing scheme which makes use of processors as conduit and collector of loans to farmers. Farmers as co-investor in the VCO value chain.</p>	<p>With access to credit and other financing schemes MSME value chains are able to invest for expansion, for adoption of better technologies for getting certifications needed to strengthen current export markets and the entry of new markets.</p> <p>These generate more employment as well as maintain good work practices and conformance to international certification standards in food safety, employment and sustainability.</p>
3. Industry association limited interventions in VCO value chain and industry development.	<p>Government support the strengthening of VCOP's capability to undertake and collaborate R&D&E, to coordinate information flow along the value chain and generate market information through the establishment of a management information system (MIS), and to enter into marketing agreements with buyers.</p>	<p>Government and VCOP partnership in R&D&E, market information system for value chain processes coordination and marketing initiatives.</p>	<p>An industry association that directly participate in competitiveness capability building of MSME and other industry value chains promotes industry growth. With industry growth more employment is generated.</p> <p>Entering export markets primarily as an industry initiative is a VC inclusiveness strategy that allows the participation of more MSMEs in the export marketing channel. With more MSME participation more employment is generated.</p>
4. Inadequate government support services in	<p>Government step up its support to the NTCP value chains to increase its share of the total coco products export volume</p>	<p>PCA roadmap that clearly spells out the development of the NTCP sector with focus on</p>	<p>Government support for MSME VCs enhances its competitiveness and growth. These include productivity</p>

promoting and developing NTCP value chains.	and value. This could be through a more comprehensive and integrated R&D&E program, far reaching financing schemes, and competitiveness enhancing programs. One such program is the development of farm production clusters with technical and financial support with option to go into forward vertical integration in VCO processing.	value chains with potential for growth and competitiveness. Enhance government services in R&D&E, financing, technology transfer and technical skills enhancement, management information system, and marketing initiatives and market development.	enhancing programs, technology generation and adoption initiatives and financing support schemes. Competitiveness enhances enterprise growth and therefore, the generation of more employment and the improvement of quality of employment.
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3.1.6. Recommended VCO business model

The design of the VCO value chain business model considers two general parameters: competitiveness and socio-economic goals. Competitiveness include competitive price, conformance to quality, production volume and flexibility or the ability to respond to technological changes and market changes. For socio-economic goals to be achieved, the MSMEs should be competitive to sustain profitability and consequently its business operation. Since most enterprises produce both VCO and coco sugar products and taking note of their similarities, the recommended VCO value chain will be integrated with the with the coco sugar VC model and will be presented in Section __ of this study.

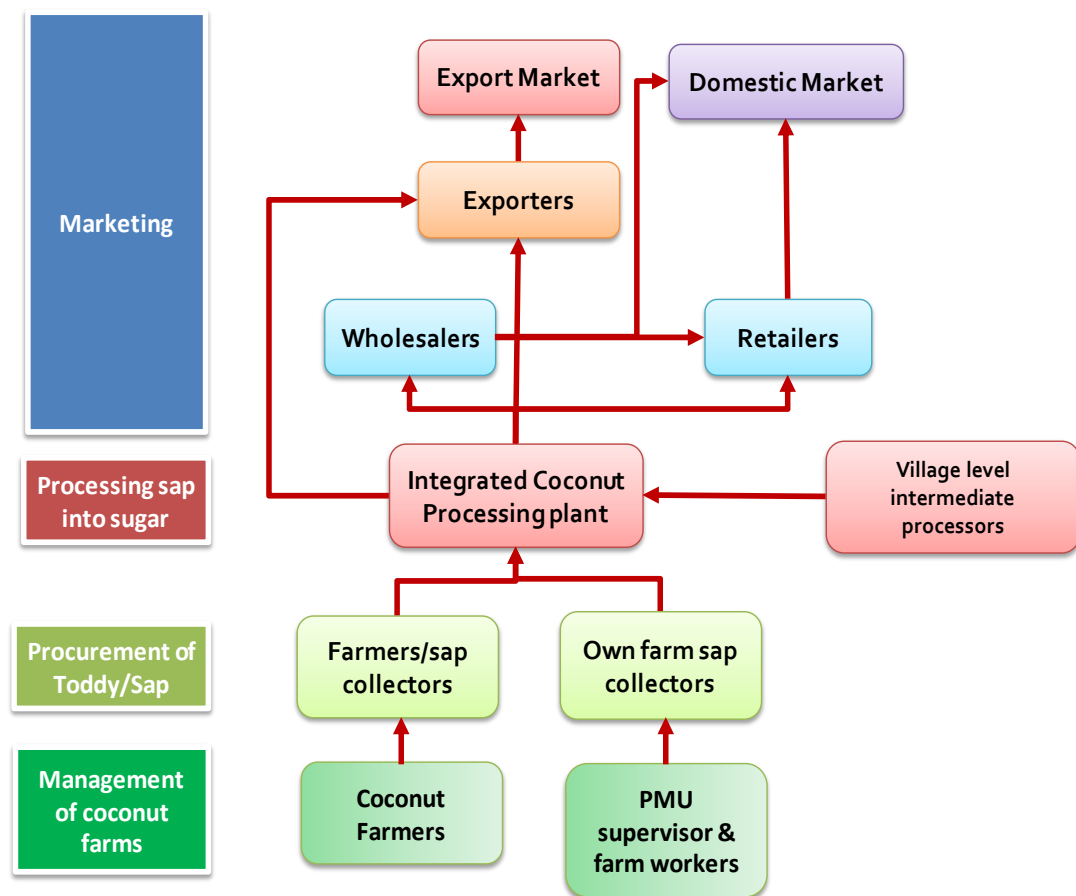
3.2 The coco sugar value chain

The coco sugar value chain has been discussed in the first report in much detail but is more comprehensively analyzed in this report. Primary information from the TRAVERA Enterprise survey, KIIs with Pasiolco and Greenlife enterprises supplements the secondary data and information used as inputs in the analyses.

As noted in the first report like the VCO value chain (VCO-VC) the coco sugar value chain (CSVC) is short and simple. It consists of simple processes starting with the collection of sap, followed by processing and ends up with the packaging and marketing of coco sugar in the domestic and export markets. It has a very similar structure as the VCO VC and differs only with the type of raw materials used for processing. In VCO processing the raw material is coco meat while it is coco sap in coco sugar processing. **Figure 18** shows the CSVC with the processes and key players.

Coco sugar positions as a special sweetener for the health conscious food and organic products niche market because of its low Glycemic Index (GI), rich nutritional content and the nature of its raw material (coco sap). In the sweetener market it competes with other natural (i.e., stevia,

Figure 18 Coco sugar value chain with processes and key players



monk fruit, raw honey, blackstrap molasses, maple syrup) sweeteners and artificial (i.e., aspartame, acesulfame potassium, neotame, saccharin, sucralose) sweeteners.

The processing technology is simple and consists of non-automated and non-self-measuring processes and equipment. The simplicity of the process and the low cost technology make coco sugar processing a suitable business venture for MSMEs. Farmers could easily forward integrate into coco syrup or intermediate coconut sugar production which could significantly add to their income. Moreover, the multiplicity of products that could be derived from coco sap provides flexibility to MSMEs in shifting from products that become less profitable to ones that are more profitable and have better growth potential. Aside from coco sugar a processor can produce other sap-based products such as vinegar and its variants, coco amino, coco syrup/coco nectar, coco jam, coco wine, coco balsamic, coco cider and coco spirit ('lambanog'). Also employment generation is relatively higher compared to other processed coconut products because of the manual process in production as well as the need for intensive labor in the harvesting and collection of coco sap.

Value chain processes

There are four processes in the CSVC. These are the growing of the coconut trees, harvesting and collection of sap, processing of sap into sugar and then marketing to the domestic and export markets. The processing node can be broken down into intermediate processing and final processing. The first is the processing of sap into coco syrup while the second is the conversion of coco syrup into coco sugar.

Processing: Generally the capacity of coco sugar processing plants are relatively small. Most are classified as micro and small in terms of asset size. The aggregate volume demanded by the market is not big enough to warrant large production plants. Moreover, coco sugar is only one of the sap-based and other coconut products produced. Like VCO processors they produce other types of coco and agricultural processed products. Greenlife and Pasiolco has VCO and coco jam as their major products, respectively, aside from producing coco sugar. Tropical Organic Harvests Philippines Inc. produces organic teas in addition to coco sugar.

The process and equipment used in coco sugar making have been discussed in the first report but is again presented here to give a better picture of the processing operation.

The process in cocosugar production is similar to that of the production of other sugar types. It basically involves the removal of moisture from the sap and the formation of sugar crystals. The technology is simple and is considered as kitchen type of technology.

Process: The process flow consists of five steps: 1) procurement of toddy or cocosap, 2) receiving and quality inspection of the cocosap at the processing plant, 3) moisture removal by regulated heating, 4) sugar crystals formation by further heating, and 5) crushing, drying, sieving and packaging (**Figure 19**). **Table 42** shows the processes and the description of each.



Figure 19 Process flow in cocosugar making

Table 42 Process flow and process description of coco sugar making

Process	Description
1. Collecting sap	<p>a. <i>Preparing the inflorescence:</i> Sap collectors select coconut trees with healthy unopened inflorescence. The fibrous cover is removed to avoid contamination. The inflorescence faces downward by constantly positioning it with a tie for a week.</p> <p>b. <i>Tapping:</i> Sap starts to drip from the inflorescence once it is cut 6 mm from the tip. A plastic vessel positioned just below the dripping inflorescence catches the sap. About 1.5 to 2.5 liters of sap can be collected per tree per day.⁸⁵ A clean cloth prevents contamination of the sap by organisms and other foreign materials.</p> <p>c. <i>Frequency of collection:</i> Collection of the vessel with sap is done every five hours which is then immediately delivered to the processing plant. Four collections are done daily. This is to avoid fermentation and maintain a pH of not less than 6. Bamboo bridges connect one coconut tree to another to facilitate collection from tree to tree. More or less 50 trees are connected in this web of bamboo bridges.</p>
2. Removing the moisture	<p>a. <i>Inspection of delivered sap:</i> Inspection of the sap on arrival for possible contamination and checking the pH level to ensure that the sap is within the standard level.</p> <p>b. <i>Heating the sap to remove moisture:</i> The sap is poured in a cooking vat ('kawa' or 'wok') and then heated up to 115°C for three to four hours to evaporate the water and produce syrup. The scum arising from the boiling process is constantly removed as it forms to avoid producing dark residues in the sugar.</p>
3. Transforming syrup to sugar	<p>a. <i>Heating the syrup:</i> The syrup is then transferred to a food grade heating vessel and further heated over a medium fire. It undergoes continuous stirring until the syrup becomes thick and difficult to stir.</p> <p>b. <i>Cooling:</i> The heated syrup is then cooled and continuously stirred until the formation of the sugar granules.</p>
4. Crushing, sieving and drying	<p>a. <i>Crushing:</i> The sugar lump are then crushed to produce fine crystals.</p> <p>b. <i>Sieving:</i> The crushed sugar undergoes sieving to produce uniform size granules.</p> <p>c. <i>Drying:</i> Drying to moisture content of 4% follows under normal room temperature and/or through mechanical method. About 8 liters of sap can produce 1 kilogram of sugar.⁸⁶</p>
5. Packaging and storing	<p>a. <i>Packaging:</i> The sugar granules are packaged in plastic bags and/or plastic food grade containers.</p> <p>b. <i>Labeling:</i> Labels on the pack indicates the brand, unit weight, production date, certifications and other pertinent information.</p> <p>c. <i>Packing and storing:</i> The product is packed in cartoons or other types of bulk containers and then stored for inventory.</p>

Source: Compendium of Commercially-viable Coconut Technologies. Book Series No. 04/2015. DOST-PCAARRD)

Rejected sap are processed into vinegar, balsamic sauce, coco wine and/or coco spirit (lambanog). When it is more profitable to produce other sap-based products such as coco vinegar the sap is diverted to its production. The sap is collected once or twice a day instead of the usual four days for coco sugar production.

Equipment and materials: Sugar making equipment are simple and are of kitchen type. **Table 43** shows the equipment used under each sugar making process.

⁸⁵ Compendium of Commercially-viable Coconut Technologies, DOST and PCAARD. Book Series No. 04/2015. p 3.

⁸⁶ *Ibid*, p 3 .

Table 43 Materials and equipment for coco sugar making

Process	Materials/Equipment
Collecting sap	Inflorescence cutting blade. Collecting vessel (2 liter) Container (4 liter) Bamboo pole bridges
Testing the quality of the sap	pH meter Fine meshed sieve
Removing the moisture	Woks (20 liter and 100 liter) Ladles Solid fuel fired stoves
Transforming syrup to sugar	Stainless wok Ladles Electric stoves or LPG fired stoves Spatulas Wooden trivets
Crushing, sieving and drying	Ladles Stainless strainers Drying trays Stainless vessels
Packaging and storing	Spatula Plastic bags and plastic containers Weighing scale Plastic sealer Carton boxes

Source: Compendium of Commercially-viable Coconut Technologies. Book Series No. 04/2015. DOST-PCAARRD)

Variability in quality is a common problem from the use of solid fuel stoves and non-measuring stoves in drying or crystallization of the syrup. The difficulty of controlling the heat from solid fuel combustion results to variability in finished products per production cycle and from processor to processor. It is therefore, difficult to standardize quality when an exporter or a coco sugar processor-exporter consolidates supply from various processors to meet large volume orders.

Basically coco sugar processing is a manual process and involves workers at each stage. Convenience and safety of workers in their workplace are important in achieving processing efficiency. The use of fueled stoves and LPG stoves in the syrup and crystallization or drying phases together with the emission of steam from the heated syrup and crystallized sugar builds up heat in the working areas making it uncomfortable and hazardous to the workers. In the TRAVERA validation forum in Davao City this is one of the concerns raised by coco sugar and coco syrup processors.

Marketing: Coco sugar MSMEs as earlier mentioned produce other products. The markets of these products are both domestic and export. Marketing of coco sugar is export oriented as most of the other products. Industry sources estimate that about 70% of total production flow to the export market.⁸⁷ The TRAVERA survey shows that about 77% of sales from 2015 to 2017 of interviewed enterprises were for export (**Table 44**). Share of export was highest at 82% in 2015 but sharply dropped to 62% in the following year. In 2017 it recovered to 78% which is still lower than the 2015 export share. The average sales are Php9.5 million from the domestic market and Php31.6 million from export.

⁸⁷ KII with Greenfield and Pasiolco (January 2019) and PCA (December 2018).

Table 44 Domestic and export sales ('000 PhP) from 2015 to 2017, TRAVERA Enterprise survey

	Region	MSME Enterprises	Domestic sales			Export sales			Total		Grand total
			2015	2016	2017	2015	2016	2017	Domestic	Export	
1	IV-A	Buenapalma Enterprises	165	165	165	-	-	-	495	-	495
2	XI	Free Food Coconut Manufacturing / Food Coconut Manufacturing	150	400	500	-	-	-	1,050	-	1,050
3	XII	Gees Organic Coco Sugar	-	1,800	150	2,000	150	120	1,950	2,270	4,220
4	XII	Gensan Natural Coco Corp. / Benevelle Corp	-	-	-	4,000	2,000	3,000	-	9,000	9,000
5	XII	Sanvicopa Inc.	4,000	3,900	4,600	800	780	920	12,500	2,500	15,000
6	NCR	The Churner Group Inc. (Suchero)	1,000	1,500	2,000	-	-	-	4,500	-	4,500
7	X	Tropical Organic Harvest Phils. Corp.	2,000	2,000	4,000	26,000	18,000	36,000	8,000	80,000	88,000
Total			7,315	9,765	11,415	32,800	20,930	40,040	28,495	93,770	122,265

Source: TRAVERA Enterprise survey, 2018

Marketing of these products is similar to that of VCO. This include participation in international food fairs, B2B market matching and with some using e-commerce marketing platforms like Alibaba and Tradekey. The use of the latter is a popular mode of advertising in the internet and in linking with buyers in the market. However, only a few of the coco sugar MSMEs avail of these services. As shown in **Table 45** there are five processor-exporters and one trader-exporter in coco sugar trading who are listed in these platforms. Preference is more on Alibaba than Tradekey. Only one enterprise, GenSan Natural Coco Corporation/Benevelle Coporation is in both Alibaba and Tradekey. **Annex 1b** contains the ecommerce services provided by these two marketing platforms.

Table 45 MSME coco sugar processor-exporters, trader-exporter and exporter in the Alibaba and Trade key e-marketing platform

	Region	Enterprise	Function	SME by Asset Size	Product/s	In Trade key	In Alibaba	Websites
1	IV-A	BUENAPALMA ENTERPRISES	Processor-Exporter	Micro	Coco sugar	Yes	No	buenapalmaenterprise@yahoo.com
2	IV-A, XI	GENSAN NATURAL COCO CORP. / BENEVELLE CORP	Processor-Exporter	Micro	Coconut sugar, coconectar	Yes	Yes	http://benevelle.com
3	IVA	PASCIOLCO AGRI VENTURES	Processor-Exporter	Micro	VCO, coco jam, coco syrup, coco sugar, coco sap vinegar, coco aminos, coco balsamico.	No	Yes	www.pascolcoagriventures.com
4	IVA	LAGUNA ORGANIC FARM & PRODUCTS	Processor-Exporter	Small	Coconut sugar, coconut-based food products, processed pili nut	No	Yes	No website, but with Facebook account
5	X	TROPICAL ORGANIC HARVEST PHILS. CORP.	Processor-Exporter	Small	Coconut sugar	No	Yes	https://www.facebook.com/sorelorganics
6	XI	SOUTHERN YUI FARM INC.	Trader-Exporter	Micro	VCO, coco sugar, other fruit processed products***	No	Yes	None

Source: Alibaba and Tradekey advertisers' list. February 2019.

Like the VCO processors they directly export and/or indirectly export. In the latter they tap broker-exporters who act as agents of importers. Similar to VCO the major country of destination is the US. However, the European market has the largest potential for market expansion particularly in the manufacture of food and beverages as discussed in the global market situationer section of this report.

Procuring raw materials (Coco Sap): The procurement of raw material is a critical process in the value chain because of the high perishability of coconut sap. The sap has to be processed immediately 5 hours after harvesting to avoid spoilage.

Processing plant procure toddy/sap from its own farm and/or farmer-sap collectors. The amount of sap that a tree can produce ranges from 1.5 liters to 2.5 liters per day. A ‘mananguete’ has to climb and collect the sap three or four times a day even when it is raining.

The process of collecting sap starts with the selection of healthy inflorescence. A 6 mm cut from the tip of the inflorescence allows the sap to flow to a collecting vessel positioned just below the inflorescence (*Figure 22*). Collecting the sap to a central vessel takes twice a day one in the morning and another in the afternoon. After each harvesting the sap collector cuts a thin part of the old incision to maintain continuous flow of sap. Sap collectors then bring the sap to a collection center that consolidates the delivery to the processing plant.

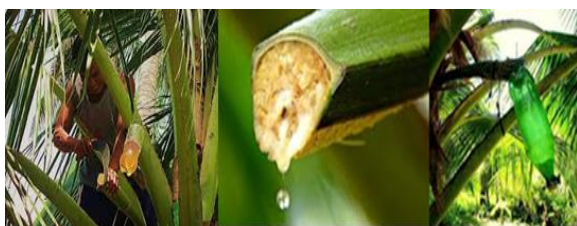


Figure 20 Tapping inflorescence and collection of sap

Delivery to the processing plant is done every five hours after collection to avoid fermentation and deterioration of quality. The required pH of the sap should not be less than 6. The availability of ‘mananguetes’ during the collection time is critical in maintaining quality. Sometimes they are not around or are in social events

leaving the sap unharvested and consequently fermented. In this situation processors use the fermented sap in the production of vinegar. Transport logistics is also crucial in timely delivery and maintenance of sap quality. To ensure timely delivery processing plants use its own logistics transport.

Coco sugar and sap-based processing enterprises procure their raw material either from its own farm or from independent and cooperative-member farmers or from both sources. The sap comes from traditional tall varieties and/or dwarf varieties (i.e., Takunan and Katigan varieties). The latter is more preferable because of ease of tapping and sap collection and earlier fruit bearing age. Dwarf varieties bear fruits 2 to 3 years after planting compared to the 4 to 5 years fruit bearing age of traditional tall varieties.⁸⁸

The tapping and collection from tall varieties are done by hired tappers. A tapper could climb 10 to 25 tall trees per day in tapping and collecting sap.⁸⁹ This means about 20 liters to 50 liters of collected sap based on an average output of 2 liters per tree per day. This is done three to four times a day, two in the morning and two in the afternoon and night time. Tappers/collectors of dwarf variety on the other hand collect 90 to 120 liters of

⁸⁸https://www.researchgate.net/publication/325187205.Indigenous_technology_of_tapping_collecting_and_processing_of_coconut_Cocos_Nucifera_sap_and_its_quality_in_Blitar_Regency_East_Java_Indonesia [accessed Oct 09 2018].

⁸⁹ Researchgate, Op. cit.

sap per day⁹⁰ which is more than twice the collection of tappers of traditional tall coconut trees. Hybrid coconuts produce about 4 to 8 liters per tree.⁹¹

In Quezon province, processors buy good quality coco sap for coco sugar processing at PhP15.00 per liter. The price of coco sap for vinegar and ‘lambanog’ is PhP10.00 per liter, PhP5.00 per liter less than the good quality sap. A farmer-sap collector for coco sugar with 50 coconut trees and an average yield of 2 liters of sap per tree can earn about PhP30,000.00 per month.⁹²

The quality of raw material is a key determinant of coco sugar quality. The metrics of quality is the level of sugar break. Philippines coco sap has a sugar break⁹³ of 12.5% which is a little bit higher than Indonesia’s sugar break of 11% to 12%. Moreover, Filipino farmers and processors do not use anti-fermenting agents such as limestone and mangosteen bark to retard the fermentation of the sap at the field level which is a practice in Indonesia. Quality is much better as the sap is immediately processed within the required time producing unadulterated or pure coconut sugar. Adulteration or the mixing of coconut sugar from sap with and without anti-fermenting which has put the quality integrity of the product has become a concern of Indonesian coconut sugar exporters.

Sap quality has become a competitive advantage of Philippine coco sugar as it is transformed into good quality coco sugar. However, Indonesia’s high volume of production, more experience in production and established market presence have allowed it to dominate the market of sugar in the global market.

Key players in the VC

The key players in the CSVC are the coco sugar processors, the traders-exporters and broker-exporters in the outbound chain and coconut farmers/coco sap suppliers and intermediate processors in the inbound chain.

Coco sugar processors: The MSME coco sugar producers processes variants of coco sap based products and other processed coconut products such as VCO, coco flour, coco cream, coco milk and coco water. They have an integrated coconut processing plant which are located near the coconut farms. For example, Treelife and Benevelle corporations locate their plants at the proximity of coconut plantations which they manage and operate. However, some of the enterprises especially those that process intermediate products such as coco syrup locate their processing plants at the urban centers where there are stable power and water utilities. These enterprises include Pasiolco and Greenlife.

There are also processors and processor-exporters who focus on coco sugar. In the TRAVERA Enterprise survey six out of the 11 processor-exporters respondents regard coco sugar as their major product (**Table 46**). Five of these enterprises are located in Mindanao (Regions X, XI and XII) and the other operates in Region IVA.

Processors directly export their products rather than depend on broker-exporters or trader-exporter. Of the 15 coco sugar MSMEs in the TRAVERA Enterprise Survey, 10 (67%) are processor-exporters. There is only one broker-exporter and one trader-exporter. There are several factors that discourages broker-exporters in including coco sugar in their product portfolio. These include the smallness of the size of the market, competition from similar products and being a niche product -- factors that make it difficult to market coco

⁹⁰ Zac B. Sarian. Coco Sugar Worth ₱12,000 From A Tree Per Year. AgriMagazine. September 2014 as taken from <http://agriculture.com.ph/2017/11/17/coco-sugar-worth-%E2%82%B112000-from-a-tree-per-year/>

⁹¹ KII with Greenlife, Tayabas, Quezon. January 2019.

⁹² Ibid.

⁹³ Sugar break ratio is the percentage kg yield of sugar from sap

sugar. Niche products such as coco sugar require extensive promotion and advertising to highlight product differentiation to attract discriminating buyers in a highly competitive market.

Table 46 Coco sugar MSMEs – products, location and classification

	Region	Enterprise	Function	Classification by Asset Size	Product/s
1	IV-A & V	Laguna Organic Farm & Products	Processor	Small	Organic coconut sugar , organic coconut-based food products, organic processed pili nuts, organic fresh mangosteen, organic cacao
2	XII	Aroman Natural Food Women's Producers	Processor	Micro	Coco sugar
3	XII	SANVICOPA INC.	Processor	Micro	Coco sugar
4	IV-A	GREENLIFE COCONUT PRODUCTS PHILIPPINES INC.	Processor-Exporter	Medium	Extra VCO, 100% organic VCO, organic products: coco sap vinegar, coco gin ('lambanog'), coco sugar , coco butter, coco syrup, coco jam, coco culinary oil, cosmetic VCO, certified organic MCT oil (has 15 types of coco products)
5	IV-A	BUENAPALMA ENTERPRISES	Processor-Exporter	Micro	Coco sugar
6	IVA-NCR	PASCIOLCO AGRI VENTURES	Processor-Exporter	Micro	VCO, coco jam, coco syrup, coco sugar , coco sap vinegar, coco aminos, coco balsamico.
7	IV-A	AMAZING FOODS CORPORATION	Processor-Exporter	Small	VCO (organic), coco sugar (organic) , coco ginger tea, coco jam, coco cacao marmalade, aromatherapy massage oil, soap*
8	XI	FREE FOOD COCONUT MANUFACTURING / FOOD COCONUT MANUFACTURING	Processor-Exporter	Micro	VCO, Coco sap sugar
9	XII	GEES ORGANIC COCO SUGAR	Processor-Exporter	Micro	Coco sugar
10	IV-A, XII	GENSAN NATURAL COCO CORP. / BENEVELLE CORP	Processor-Exporter	Medium	Coconut sugar, coco nectar
11	XI	HEALTHY SWEETS	Processor-Exporter	Micro	Coco sugar
12	NCR	THE CHURNER GROUP INC. (SUCHERO)	Processor-Exporter	Medium	Coco sugar
13	X	TROPICAL ORGANIC HARVEST PHILS. CORP.	Processor-Exporter	Medium	Coconut sap sugar
14	NCR	TEAM ASIA CORPORATION	Exporter	Small	Virgin coconut Oil and VCO-based coconut products, RBD, coco sugar , coco milk powder, coco honey, organic vegan coconut cream powder
15	XI	SOUTHERN YUI FARM INC.	Trader/Exporter	Micro	VCO, coco sugar , other fruit processed products

Source: TRAVERA Enterprise survey, 2018

Table 46 also shows that most of the MSME coco sugar processor-exporters are small and medium size based on capital asset size. This is expected since it requires capital investment in processing facility, backward integrated raw material procurement system and value chain and product certifications. These enterprises position their coco sugar in the market as organic, non-GMO and vegan and complying with food safety standards, fair trade act and environmental rules and regulations. Others have certifications of Halal and Kosher for Muslim and Jew consumers, respectively.

Coconut farmers/Coco Sap Suppliers: The coconut farmers either serve as sap supplier or provide the coconut farm for lease to coco sugar producers. As a sap supplier they can manage about 50 trees a day to tap the coconut inflorescence, harvest and collect the sap. The farmer leaves part of his/her farm to the production of nuts, copra and/or fresh nuts.

As indicated in the raw material procurement section, a farmer who sells sap rather than nuts earn much more. Greenlife pays as much as PhP15.00 per liter for a sweet good quality sap and PhP7.00 per liter to PhP10.00 per liter for lower grade sap. If a farmer allocate 50 trees of his one hectare farm to sap production, he could harvest about 1,875 liters per month from these trees. If he produces 100% sweet good quality sap he will earn about PhP28,825.00 per month. At 70% good grade and 30% lower grade he earns a reasonable good income of about PhP25,000.00 per month.

For processors who backward integrate to manage and operate leased lands from absentee landlords and farmers, sap tappers are hired. Usually a farmer with his family is assigned to take care of a half hectare to one hectare and at the same time do the sap harvesting and supervise tappers hired to harvest other parts of the farm.

Trader-exporters and broker-exporters: Like the VCO traders-exporters and broker-exporters, these enterprises buy in bulk or private label from processors for their client importers. However, the survey showed that there are very few exporters who carry coco sugar in their export products portfolio.

The traders-exporters buy from coco sugar processors to consolidate supply for large volumes. Broker-exporters on one hand act on behalf of importers and usually buy private label coco sugar. Bulk purchase is not common for this product. However, coco syrup the intermediate raw material for coco sugar is sold in bulk usually in 200 li plastic drums.

3.2.1 Dynamics in the MSME coco sugar value chain

Heightened health awareness, food safety, and environmental protection are the drivers of the demand for coco sugar. MSME processors, therefore, position coco sugar as a healthy and nutritious sweetener due to its low glycemic index (GI) of 35% and its nutritional value. As a healthy substitute to sugar it competes with artificial sweeteners and other natural sweeteners.

The capacity of MSME processors are relatively small because of the smallness of the size of the market. They also produce other products since sap can be processed into other forms such as coco vinegar, coco balsamic, coco jam, coco cider, coco wine and coco spirit (lambanog). Processors directly process the sap into coco sugar and/or procure from village level processors coco syrup which is then processed into coco sugar. The village level processors are micro- and small entrepreneurs and farmers who forward integrate.

The village level processors get their sap from farmers and/or sap collectors. The number of village level processors supplying a processor-exporter depends on the plant capacity of the former. Usually their capacity is small. By utilizing these processors the processor-exporter reduces his investment on capital assets and operating capital while improving economies of scale of production.

According to PCAARRD, an entrepreneur who will set up a 118 kilogram per day coco sugar processing plant would need more than a million pesos to set up the facility and about a hectare of coconut trees to supply the 1,000 liter of sap for the daily production. The daily cost of raw material is about PhP15,000.00.

Aside from these investments the entrepreneur has to spend more than PhP300,000.00 to cover three certifications such as organic, JAS and other kinds of certifications. The popular certifying firm is Control Union Philippines Inc. an internationally accredited food safety, organic, and traceability certifying service provider. This is a multinational company that is engaged in the field of inspection and certification in organic and sustainable agricultural, forestry and textile industry.

Other processors have vertically integrated operations. Besides doing the production of coco sugar they do the marketing of their products and procure raw material or sap from own managed and operated farms. As earlier discussed absentee landlords and coconut farmers own the leased land. Processors' own coconut farms also form part of the raw material production.

Unlike in the VCO value chain there are no traders nor consolidators of raw materials. The small volume of production, inherent perishability of sap and the difficulty of coordinating sap harvesting and processing prevents trading of sap.

Box 02 presents the dynamics in Pasiolco International Inc. value chain. It is representative of the dynamics of the coco sugar value chain in the country.

Box 02 Pasiolco International Inc. – Coco Sugar Integrated Processing Enterprise

Pasiolco International Inc. is an integrated processing and marketing company based at Candelaria, Quezon in Region IV-A. It produces 15 variants of processed coconut products such as organic coco jam with coco syrup, organic coco jam with muscovado, organic coco sap sugar, organic coco syrup, organic coco sap vinegar, spiced coco sap vinegar, spiced coco sap vinegar, organic coco balsamic, organic coco aminos, organic coco cider energy drink, organic coco vodka wine, VCO, aromatherapy massage oil, coconut cooking oil and menthol balm.

Processing Pasiolco produces coco sugar at the farm level which are then packed at its central processing plant at Candelaria town proper. It uses the traditional method of coco sugar production. Aside from coco sugar it produces coco syrup which it inventories when the price of nuts is low. These are later used in processing sugar and other value added coco products and is exported in retail packs and in bulk.

Sales and marketing Currently Pasiolco export cocosugar, coco jam, coco syrup, VCO and other coconut processed products to the USA, Europe (Germany, UK), and Asia. Coco sugar is exported in retail packs with private label and seldom in bulk packed in plastic or steel drums. Marketing orders depend on the requirement of the buyer and not by annual purchase contract. The marketing of diversified products provide the buffer for fluctuation in demands of coco sugar.

Most of its buyers make use of broker-exporters who act in behalf of an importer. The broker-exporters handle assorted fresh and processed agricultural products. Minimum order supplied is one container load.

Raw material procurement Pasiolco manages and operates own and leased organically certified coconut farms and farmers' contracted farms. Currently it has 80 hectares of farm certified as organic by the Control Union Philippines Incorporated. The sap from these farms is not only for coco sugar production but also for other coco processed products. About 20 farmers manage these farms for the production, harvesting and collection of sap. The supply relationship of these farmers with Pasiolco is informal and is based in trust.

Hired tappers ('magkakarit') and sap collectors supply the sap for processing. Pasiolco pays the tappers Php8.00 to Php9.00 per liter and buys sap from collectors at Php12.00 per liter. The availability of tappers is emerging as a problem as they have the tendency to move to other more lucrative jobs. For coco sugar harvesting of sap is done four times a day while for sap used for other products such as vinegar and 'lambanog' harvesting is 2 to 3 times a day as sap fermentation is not a problem.

The quality of sap is measured by its brix and pH level when delivered. Laboratory testing of sap is diligently done to avoid adulteration of the sap with water which was experienced by Pasiolco in the past. For other tests required by buyers, the company uses the services of a testing laboratory at Lipa City.

The price of nuts influences the price of coco sap, such that when the price of nuts go down the price of sap also drops. When the sap's price drops Pasiolco intensifies its sap procurement and production of coco syrup. The syrup is packed in 200 liter plastic drums and then inventories for future sales and production of coco sugar and other sap based coco products.

3.2.2 Measuring quantity and quality of employment in the value chain

Employment: The coco sugar VC generates about 1.06 FTE per metric ton which is higher compared to the VCO and coco coir value chains (**Table 47**). Most of the FTEs are in processing (0.90 FTE/MT) and in tapping (0.16 FTE/MT). In processing, intermediate processing of coco sugar produces more FTEs at 0.63 per metric ton. This is an opportunity for generating more employment in the chain if there are more intermediate processing units at the field level connected to a central processing and standardization plant. Farmers will benefit by forward integration and rural workers could be employed in this activity.

Table 47 Estimated FTE per MT of coco sugar

	Activity	PD/MT	FTE/MT
1	Farming	3.14	0.01
2	Tapping	50.00	0.16
3	Intermediate processing	200.00	0.63
4	Final processing	86.00	0.27
	Total	339.14	1.07

Assumption: 8,000 liters of coco sap = 1 MT coco sugar

Source: Coconut Industry Value Chain Study, BAR, 2018

In 2018, there are about 414 workers employed in coco sugar processing. More than half are male workers and 47% are female workers. Majority or 57% are regular employees while some are casual (19%) and seasonal (13%). Only few are probationary (1%) and contractual (1%).

For the past three years, there has been an increase in the number of persons employed in coco sugar processing. From 341 workers in 2016, the number of persons employed in coco sugar processing has increased to 414 in 2018. This is due to the increase in the production of coco sugar through the years in response to increasing demand. Increased volume of production required a greater number of workers in operation. More women are given opportunities in the workplace as indicated by the increase in number of hired women from 153 in 2016 to 195 in 2018.

Table 48 Employment in coco sugar processing by type from 2016-2018, Philippines

Employment Type	2018				2017				2016			
	%	Total	M	F	%	Total	M	F	%	Total	M	F
Regular	57	234	82	152	59	211	79	132	57	196	69	127
Probationary	1	3	1	2	1	3	1	2	1	3	2	1
Casual	29	118	102	16	24	86	86	0	25	86	86	0
Contractual	1	5	4	1	1	5	4	1	1	5	4	1
Seasonal	13	54	30	24	14	51	27	24	15	51	27	24
Total	100	414	219	195	100	356	197	159	100	341	188	153

Source: Interview from coco sugar processors

Recruitment. Employees in coco sugar processing are directly recruited by companies through formal recruitment process. Coco sugar processors seldom recruit through informal channels or means (i.e. through farming communities, informal groups of farmers or word of mouth referrals) except for production and processing-related jobs such as packaging, labelling, product development, product design, food safety, etc. and logistics and transportation-related jobs involving delivery of goods, transport of goods, etc. Almost half of the coco sugar enterprises surveyed note their difficulty in recruiting highly-skilled workers.

Length of work contract. Regardless of the employment type, fifty-three per cent of the surveyed coco sugar processors do not have formal written contracts with their employees.

For workers under contractual or seasonal work, only 37% of the enterprises surveyed said that they regularize these workers. The top three (3) reasons cited for not regularizing workers are business uncertainty, significant increase in labour cost, and seasonality of business.

Skills and Training. The level of skills of workers in the farming and processing side is relatively low. In the farm level, sap harvesting is a simple skill that could be learned through short training. In the processing side drying which is the major activity requires simple manual skills which can be easily required by workers. If drying is done mechanically by a self-measuring and regulating dryer the skill needed is just for operating and trouble-shooting the equipment. In addition, additional skills in maintaining and operating the equipment and implementation of GMP and HACCP protocols are important in achieving compliance to process and product certifications.

Only the skilled workers are hired from manpower service agencies. These include sales agents, engineers, and operations managers. Employees are hired even without prior work experience.

Coco sugar processors provide trainings to their workers. Workers are provided with trainings internally conducted or organized by the companies, trainings sponsored by government, industry association, or academe and trainings provided by outside consultants and/or product supply dealers. Training providers include Department of Science and Technology (DOST), Department of Agriculture (DA), Department of Trade and Industry (DTI), Philippine Coconut Authority (PCA), Peace and Equity Foundation, Food and Development Authority (FDA), Cooperative Development Authority (CDA), Department of Labor and Employment (DOLE), PinoyMe Foundation Inc., and Peterson Consultancy among others. However, eighty-four per cent of the surveyed coco sugar processors cite the lack of competent skills trainers a difficulty they encounter in providing trainings for their workers. Most of the enterprises also mentioned lack of information on skills training or courses and the low quality of courses offered as challenges in training their workers.

Working Conditions including occupational safety and health. In terms of working conditions, thirty-two per cent of the coco sugar enterprises said that they provide scholarship grants or financial assistance to their workers and their children or family members. As to benefits, Table __ below shows that almost half to more than half of the enterprises provide bonuses, paid holidays and health insurance for their workers.

Base: Sample enterprises	(19)
	%
Bonuses	47
Paid holidays	42
Health insurance	53
Flexible working hours or "flexitime"	37
Discount on products	37
Disability insurance	11
Life insurance	32
Profit sharing	16
Others	21
No information	16

More than half of coco sugar enterprises indicate that they register their workers, regardless of employment status, with the national security and insurance systems. Most

of these enterprises also said that they do not have problems in complying with national labour regulations.

In processing coco syrup and coco sugar, heat from steam produced in the drying process and heat from the exposed burners lower the productivity of workers and pose as a health hazard. The level of heat intensifies during the warm months or dry season creating an unfavorable working condition. As to the rest of the operations the quality of jobs is reasonably acceptable particularly those VCs that are GMP and GAP certified.

At the farm level, like in the VCO VC, the safety issue is the climbing of tall trees to tap and collect the sap. Tappers-sap collectors face the danger of accidentally falling from the tree. The hazard increases when tapping or collection is done at night, when it is raining and when there are strong gusts of wind. The risk increases when the climber is not in good physical or mental health conditions. They have to climb the coconut tree four times a day to collect sap highly suitable for coco sugar making.

Taking this into account, more than half of coco sugar enterprises shared in the TRAVERA survey that they have established measures for fire protection and control, materials handling and storage and personal protective equipment and devices. Less than half of these enterprises, however, said that they have measures for training of personnel in Occupational Safety and Health Standards, machine guarding, handling of hazardous materials. The same is true as to the number of enterprises which have established safety and health committees and procedures for notification and recording of occupational injuries and illnesses.

3.2.3 Constraints in the coco sugar value chain

Several constraints in the various nodes affect the performance of the CSVC. Among others these include key concerns in marketing of variability in quality and competition from other products. In processing, technology development and adoption prevents volume production and product standardization. In raw material procurement, supply stability faces challenges in technology, harvesting and collection of sap and availability of tappers. These are further discussed in the succeeding section.

Marketing The market of coco sugar is a niche market characterized by quality discriminating, health conscious, food safety conscious, environmentally aware and fair trade concerned consumers. In this slowly growing market niche it has to compete with artificial sweeteners and other natural sweeteners. These products position themselves in the market as a healthy substitute for refined cane sugar.

Artificial sweeteners account for the largest share in the market. However, there is a gradual shift to natural sweeteners due to health concerns related to the former. The organic market for food products has been growing at a slow but steady rate and is expected to maintain this trend. Leading the natural sweeteners in the market is stevia, a natural sweetener derived from leaves of stevia plants. Aside from these sweeteners Philippines CSVCs face competition from Indonesia, the top coco sugar producer in the world.

The type of market transaction is also another constraint that not only affect sales but also the processing. Open market type transaction is the norm in which buyers order only when needed. There is no long term buying arrangement such as quarterly, bi-yearly or yearly order contracts.⁹⁴ This creates difficulty planning the operations of CSVCs and could lead to inefficiencies along the entire chain from the procurement of raw materials, level of inventory to be maintained and achieving target sales and revenues.

⁹⁴ KIIs with Pasiolco and Greenlife, January 2019.

Processing: Generally, the level of processing technology used is still based on the traditional method of coco sugar processing. There are only a few processors like Beneville Corporation and Treelife which are into mechanized processing.

The traditional method is a constraint in product standardization since the equipment used specifically the dryers are not self-regulated and self-measuring. The common practice is the use of vats using wood and/or coco shells/husks as fuel to produce the syrup and coco sugar. Control of the process therefore, is not easy because of the unstable combustion inherent to these type of fuel and therefore, produces inconsistencies in quality per production cycle. Moreover, since the control of the process is dependent on the experience of the assigned worker, replacement of the worker with others who are less experienced increases the risks of producing non-uniform products.

There are processors who use LPG fired burners in the final processing of coco sugar. However, the cost of the fuel as well as stability of supply are areas of improvement. Although drying is more stable with this type of fuel the drying system is not self-measuring and not controlled and as such, variability in quality can be expected per production batch.

Procuring raw materials: Raw material procurement is another critical process in the CSVC. Highly perishable it has to be delivered and processed immediately in the processing plant. The availability of harvesters or ‘mananguetes’ is an emerging problem as they shift to other works that they find more profitable. Although farmers also harvest the sap most of the hired tappers comes from other places or provinces. What's more these tappers every now and then attend social activities that prevents them from harvesting the sap. This downgrades the sap to vinegar or ‘lambanog’ making instead of being used for coco sugar processing.

The productivity of existing coconut trees is another key concern. Existing trees especially the very old ones produce less sap than hybrid and mature trees. Old trees produce less than 1.5 liters of sap per day compared to mature trees that produce 1.5 to 2 liters of sap a day. In Quezon Greenlife estimates farmers’ sap production at only 1.0 to 1.25 liters per day. In contrast, hybrid trees produce as much as 4 to 8 liters of sap per tree.

Support services from external institutions: Constraints in the services provided by CSVC support institutions are similar to that faced by VCO-VC and as such, will not be discussed in this section. It is important to note however, the absence of an industry association for coco sugar. Processors and processor-exporters are members of other business associations. For example, Pasiolco is a member of Quezon Chamber of Commerce and Industry, Quezon Producer and Exporter Association, PHILEXPORT, Philippine Food Exporter and Virgin Coconut Oil Producer Association.

Without an association CSVC key players could not advocate for policies that could promote the development of the industry, go into collective marketing that will allow volume supply, entry in new markets and expansion in old markets, conduct joint R&D&E for better technology development and adoption and product development, and other benefits.

3.2.4 Practical recommendations

The CSVC to achieve better competitiveness in the market and sustain the industry’s growth and development should address the identified constraints. The interventions to improve chain performance could range from innovative marketing approaches to more efficient farm and postharvest operations.

Marketing: CSVS players to be competitive in the market should address the issues on price, quality, volume and the consistency to produce competitively priced, good

quality and large volume order of coco sugar. **Table 49** shows the recommended interventions to address marketing concerns, the expected output and the impact on employment and quality of work.

Since the VCO VC and the coconut sap sugar VC are very similar, the recommended interventions are comparable and the impact on employment and quality of work are the same.

Table 49 Recommended interventions to address marketing concerns in the CSVC, the expected output and impact on employment and quality of work

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Small market base.	Diversify to other geographical markets and promoting the use of coco sugar for industrial applications such as in chocolate making, confectionery, beverage and other processed food. Promote the use of coco sugar in the domestic market. This could move CSVC from a niche market to a main stream market.	Wider market base that include both domestic and export markets. A wider market base due to a diversified market reduces marketing risk inherent of a narrow market.	The impact of interventions is similar to that of the VCO value chain. Please refer to Table 37 of page 84.
2. No industry association to act in behalf of the industry enterprises and in doing collective actions in the CSVC.	Key players organize an industry association with support from government institutions such as the PCA, DTI and DOST. The industry association could work for policy advocacy, collaborative R&D&E and other beneficial activities. Furthermore, it could put up a marketing and industry information system to support enterprise and industry decision making.	A coco sugar industry association and a market information system accessible to industry players to facilitate enterprise value chain decision making and government policy crafting.	Same as in Table 37 of page 84.
3. Inadequate advertising and promotion of coco sugar.	Government together with the industry association that should be organized craft and implement a strategic advertising and promotion program which will include listing of the association and association members in e-commerce marketing platforms such as Alibaba and Tradekey. This would enhance the competitiveness of coco sugar against competing similar and substitute products at the same time widen the market base geographically and by market type. The latter is more so in the industrial application of coco sugar.	Collaborative strategic advertising and promotion program that spans geographical markets and market segments. Wider market base which will consequently drive entry of more entrepreneurs and expansion of present capacities.	Same as in Table 37 of page 85.
4. Low awareness of FTA agreements	The coco sugar industry that should be organized and UCAP advocate for the easing of rules of origin (ROOs) compliance	A government policy that facilitates participation of MSMEs in FTA agreements. Reforms in in the FTA	Same as in Table 37 of page 85.

and difficulty to comply the complex requirement of FTA.	and administration. The Philippine Institute for Development Studies (PIDS) recommends reforms towards electronic Certificates of Origin (COOs) and self-certification, and linkage to the national single window (NSW) which will improve timelines and ease the entry of MSMEs.	requirements that will encourage MSME exporters from availing of the benefits of the agreement.	
5. Supply not sufficient to meet large orders.	Standardization of VCO products to allow consolidation of supply to meet large volume orders. Development and adoption of self-measuring and self-adjusting dryers for syrup and coco sugar processing.	Standardized products that allow consolidated supply to meet large orders. Automated technology in coco sap and coco sugar processing.	Same as in Table 37 of page 84.
6. High market risk from a single product.	Multiproduct processing to distribute the risk of coco sugar market depression. These products include variants of sap products.	Diversified coco products with coco sugar as the main product. New products with coco sugar as a key ingredient.	Same as in Table 37 of page 85.

Processing: The processing constraints is similar to that of the VCO-VC. **Table 50** shows the constraints and the recommended interventions and the corresponding outputs.

Table 50 Recommended interventions to address CSVC processing concerns, the expected output and impact on employment and quality of work

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Most processors lack economies of scale.	Central processing centers linked to village level processing. The central processor consolidates the production of intermediate processors to create economies of scale and to standardize quality.	Central processing centers with economies of scale linked to village level intermediate processors. Lower cost of production and standardized product quality.	Similar to what is in Table 38 page 87.
2. Inadequate access to automated technology in intermediate processing and coco sugar drying.	Government through the DTI and PCA provide incentives to MSMEs who invest in self-regulating and self-measuring technology in syrup and coco sugar processing. PhilMech together with other academic research institutions develop an automated system for coco sap and coco sugar processing.	Automated systems for coco sap and coco sugar processing. More utilization of coco sugar processing technology at the central and intermediate processing centers. Lower cost and improve quality of coco sugar.	Similar to what is in Table 38 page 87.
3. Inadequate economies of scale	Promote the village level intermediate processing of coco sugar linked to an integrated central processing center. Farmers could forward integrate to value addition and micro-and small entrepreneurs could participate as intermediate processors. Aside from coco sugar the processing center could process other sap-based coco products.	Central processing center with automated processing system that creates economies of scale, improved efficiency and better quality coco syrup and coco sugar.	Similar to what is in Table 38 page 87.
4. Compliance to international certifications.	Government through the PCA and DOST provide financial and technical assistance in complying with international certifications. This could be focused on farmers who forward integrate into coco syrup and coco sugar production. This could be integrated with the technology assistance package.	More MSMEs are certified for food regulation compliance and other certifications needed to enter export markets.	Similar to what is in Table 38 page 88.
5. Access to laboratories in testing of final products.	CSVC enterprises with financial capability set own laboratory for testing their final product. It could also extend testing services to other enterprises. Testing the final product maintains quality consistency and prevents accidental and intentional adulteration. PCA could also set up laboratories at strategic locations accessible to processors. It could provide not only testing services for coco sugar but also for other types of processed coco products.	In-house laboratories of CSVC enterprises and PCA strategically located laboratory testing centers.	Similar to what is in Table 38 page 88.

Procuring raw materials: The procurement of raw materials is crucial in achieving cost efficiency, quality conformance, volume for marketing consistency of supply to markets. Without raw material the processing plants could not produce coco sugar and other sap-based products. Some of these constraints are similar to that of the VC0-VC. **Table 51** shows the recommendations to address these constraints.

Table 51 Recommended interventions to address the CSVC procurement of raw materials concerns the expected output and impact on employment and quality of work

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Productivity of existing coconut trees.	PCA intensifies the replacement of senile and dead trees with high yielding coconut varieties by involving the private sector in the establishment of accredited nurseries in addition to its nurseries to produce the planting material. There are local hybrid varieties developed by PCA and high performing imported varieties that are available. Presently PCA developed the following high yielding varieties that are outstanding producers of coco sap: 1) PCA 15-2 (Malayan red dwarf x Tagnanan), 2) PCA 15-1 (Catigan x Laguna Tall), and 3) PCA 15-9 (Tacunan x Tagnanan). In addition planting materials should also be produced from the high yielding varieties (200 nuts per tree per year) imported from Vietnam and Indonesia.	Higher productivity of coconut trees due to adoption of high yielding varieties in replacing senile and dead trees as replanting program intensifies to include private sector nurseries.	Higher productivity increases yield per hectare which improves the income of tappers and farmer suppliers. More employment is generated to handle the increase in volume in the assumption that processing plants absorbs the increase in volume. The use of dwarf varieties open up employment opportunities for tappers who do not have the skill to climb tall coconut trees. It also reduces the risks of accidents inherent from climbing tall trees.
2. Shrinking pool of tappers and sap collectors.	Mechanized climbing of coconut trees to make easy tapping and sap harvesting. Mechanized contraption in climbing can be used by non-experienced farm workers and even by women. ⁹⁵ It reduces the risks of accident in climbing tall trees particularly when it's raining. It also eases up the shortage of 'mananguetes'. Replanting with dwarf and medium tall varieties also eliminates the need of experienced climbers. In the latter long ladders could be used to tap and harvest the sap.	Mechanical equipment for scaling up coconut trees and farmers replanting with dwarf varieties.	The device allows non-experienced climbers to collect the tap. Women, like in Sri Lanka and India, can even use the device. It also reduces the risks of accidents which is high during inclement weather.
3. Low participation of farmers in sap production.	Farmers forward integrate into coco syrup processing to supply coco sugar processors. Participation in value addition substantially adds to farmers' income.	Farmers vertically forward integrating into coco syrup processing. Farmers earning higher income in coco syrup making than farmers in nut or copra selling.	Forward integration draws in micro and small farmers into valued addition that improves their income. It also provides more employment to rural workers from processing intermediate and end-product coco sugar.

⁹⁵ TRAVERA Enterprise Davao validation forum, December 2018.

3.2.5 Recommended value chain business models

These recommendations are the bases in the design and crafting of the proposed CSVV. These are integrated to tie up together the factors that impact on the chain's performance. The design parameters are competitiveness (i.e., cost efficiency, quality, volume and consistency of supply), inclusion of farmers in value addition, generation of more employment and participation of women in the workforce.

Basically the VC model of VCO and coco sugar enterprises and for that matter integrated coco products enterprise is similar. These similarities are in the value chain structure and the nature of processes. As mentioned in the VCO-VC section, the recommendation presents first a general model and then a model specific for the VCO and coco sugar enterprises. This is not a fit for all recommendation but should be adjusted in consideration of the operating conditions, scale of the enterprise and the nature of the enterprise's operation.

Generic value chain model

The recommended VC model is appropriate for both the VCO and coco sugar value chains. This model considers the forward integration of farmers into value addition through the village level or intermediate processing plants. **Figure 21** shows this model with the various processes and players in the VC.

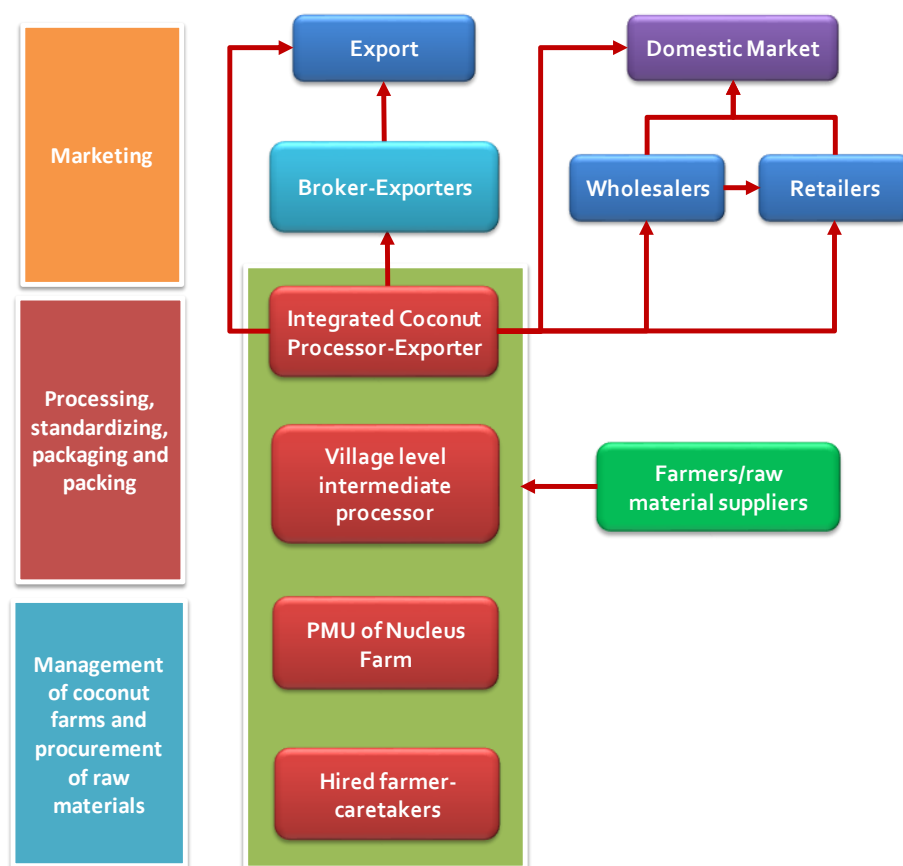
The model is vertically integrated MSME processing VC. The processing enterprise controls the management and operation of the various activities in the chain through owned operations or through formal and/or informal relationships with players in the inbound and outbound chains. The integrated activities or processes is from the procurement of raw materials to the marketing of the finished products. These are the activities within the green rectangular box in the figure. This VC model is suited for MSMEs with diversified products, highly perishable raw materials and with unstable markets.

Features of the model

The main features of this model are the effective and efficient coordination of the various processes in the value chain, the flexibility to adopt to technology, market and business environmental changes and generation of employment. The first two fits the competitiveness goal and the last the social goal of the VC.

Coordination of processes in the chain: Each activity in the chain needs to be coordinated to effectively and efficiently respond to the demands and continuous changing requirements of the market. Coordination means putting in place a management information system (MIS) so information becomes available for effective decision making such as scheduling the harvesting and deliveries of the volume of raw materials needed for a given processing cycle and scheduling the production and deliveries of finished products needed by buyers.

Figure 21 Vertically integrated VC model for VCO and coco sugar



The enterprise's MIS should be linked with industry and government information systems to access real time market information. This is in the assumption that these information systems are in place.

The MIS should enhance the capability of each player in the VC to do its function and its effectiveness in coordinating its various activities. Its objective is to create a seamless inter-phase of functions in the chain through the convergence and collaboration of resources and processes to effectively respond to market requirements, government rules and regulations and technology changes and breakthroughs.

Through an effective MIS it will facilitate the inclusion and participation of MSMEs and small and marginalized farmers in the mainstream VC. To achieve this requires some functional adjustments (enhancement of the process enterprise's capability) and the adoption of information and communication technology (ICT) tools. These will enhance access to data and information of key players in the chain both vertically and horizontally.

Two MIS systems will be developed one for strategic decision making and the other is for tactical or operational decision making. The first is an industry level MIS and the other is enterprise level MIS. Information from the enterprises' MIS serve as inputs of the former. The details of this system could be worked out by the enterprise in the case of the latter and by an industry association for the former in collaboration or partnership with existing government MIS. The same MIS system will be used in the VCO VC as well as

other NTCP VCs. The design of the MIS could be one of the undertakings in the implementation of a pilot project.

Flexibility to adopt to changes: This is the capability of an enterprise's value chain to adequately respond to changes in technology, market demand and market changes. Flexibility could be achieved through the adoption of modern productivity and quality enhancing technology for economies of scale and product standardization, more responsive linkages between market and the processor and raw materials supplier and processor and a working MIS (strategic and tactical) that communicates timely VC information.

The adoption of productivity and quality enhancing technology has implications on cost efficiency and quality of raw materials and finished products. For example, the adoption of the centrifuge technology for VCO processing has improved recovery rate as well as the quality of the oil. In coco sugar, self-regulating and self-measuring dryers improve and standardize quality and increases recovery rate. In raw material procurement the adoption of coconut hybrid dwarf varieties with superior productivity and the use of mechanized climbers improve cost efficiency and quality. The adoption of small scale processing technology could later be scaled up as demand increases. On the other hand automated processing equipment allows flexibility in producing different grades and types of products.

Adoption of innovative technology also improves the ability of the VC to respond to market demand and changing market requirements. With product quality standardization enterprises can consolidate production from other processors to meet large volume orders beyond their plant capacity. By managing and operating nucleus farms the processors can control production volume and quality of raw material as well as allocate part of the farm for the production of conventional VCO and/or coco sugar and the other part for organic certified products the sizes of which depends on the demand of the target markets.

Likewise by producing variants of coco products the enterprise has the flexibility to respond to market changes in demand at the same reducing the financial risk associated to drop in demand of single product production. Price of competing products and taste of consumers, which are drivers of demand, could change unfavorably for the product to cause demand to substantially drop.

The model also incorporates intermediate processing for flexibility in processing. Operating its own village level intermediate VCO/coco sugar processing plants and outsourcing from other intermediate processing plants allows flexibility in meeting volume orders when its capacity is insufficient to meet this demand. Intermediate VCO/coco syrup can be stored and then can be processed into its final form. The finished product can then be inventoried to build up the needed stock to fill up the order. The same is true for VCO.

In raw material procurement, supplying from its nucleus farm and outsourced farms provide flexibility in procuring the volume needed for processing. Outsource farms serve as supplemental sources when there is a sudden or unplanned rise in demand and an immediate source of raw materials for expansion purposes.

Employment Generation: Aside from providing flexibility to the VC, intermediate processing is an opportunity for farmers to forward integrate into value addition. As discussed earlier this generates higher income for farmers and provide employment for family members and other community workers. This could also attract the establishment of entrepreneurial agribusiness ventures which again will generate more employment in the rural area.

The central processing plant could have several village or entrepreneurial intermediate processors linked to its operation. This network will generate more employment compared to a one plant processing model. Traditional technology is suitable for this processing level as it requires more workers and is adaptable to field level operating conditions (i.e., unstable power supply).

Quality of work life and decent jobs: Underlying the model are the compliance to international certifications such as HACCP, GMP, GAP, ISO, fair trade, organic certifications and sustainability certifications. There are several laws, rules and regulations that covers the adoption of quality of work life and decent jobs in business enterprises but the main concern is implementation. Moreover, it varies with the development stage of the enterprise with more compliance of small and medium enterprises and less of the micro and enterprises which are still in the establishment stage.

Small and medium enterprises that are into export that are required to have traceability (ISO), GMP, HACCP and other enterprise operation and work related certifications are the ones that consistently adhere to quality of work and decent job protocols. These certifications have to be renewed every year and reviewed by an international certifying bodies.

More discussion of this topic is found in the VCO section of quality of work life and decent jobs.

Model structure

As shown in **Figure 23** the model follows the conventional processes of a manufacturing value chain. These are the processing, marketing and procurement of raw materials.

Processing: The processing function includes the intermediate processing and final processing and product standardization. The former is the transformation of raw materials (i.e., coco meat for VCO, coco sap for coco sugar) into intermediate products. The latter is the conversion of these intermediate products into standardized final products (i.e., VCO and coco sugar). Enterprise's own village processing plant and entrepreneurial intermediate processing plants do this process. The enterprise's integrated processing plant further process the intermediate products into their final forms and standardized quality by using automated production systems.

Enterprise vertically integrated intermediate processing plants. These are small scale village level processing plants that are strategically located in the farm. They are operated by farmers, farmers' association or an entrepreneur. The capacity of each depends on several factors such as proximity to coconut farms, availability of utilities and size of raw material supply base and the requirement of the NTCP processing plant. Processing technology is traditional and operations are generally manual.

Outsourced intermediate processing plants. These are owned and operated by micro- or small entrepreneurs and farmer organizations that forward integrate into processing. Processing technology is also traditional. The source of raw materials could come from enterprise own farm which is certified and/or from other farms if the product is conventional. The plants are strategically located relative to the central processing plant. Supply arrangement could be formal through contract arrangement or informal based on trust.

The coordination of the operations of the processing plants as well as the procurement of raw materials and marketing is through an enterprise level MIS linked to an industry

level MIS. This system could be a combination of mobile, cellular and internet technologies that connect the various chain nodes and which could be linked to external systems such as those of government and industry.

Marketing: Other products aside from VCO and coco sugar will be sold and positioned as organic and conventional products. The enterprise will market at both domestic and export markets. It will directly and indirectly export its products. Direct export will be through B2B transactions from business matching activities, e-marketing platforms and walk-in buyers. Indirect export will be through broker-exporters who represents importers.

Procurement of raw materials: Contracting out production is a global trend as agro-industrial processors vertically integrate to control their value chain and manage risks and uncertainties of raw material procurement and of product distribution in the market. Contract arrangements for raw material supply are vertical integration strategies to facilitate supply within a designated period at an economic price.

Consistent with this approach, the MSME VC model will source its raw materials from a nucleus farm and outsourced farms. It will directly manage and operate the former and closely coordinate with the operation of the latter. The outsourced farms made up of independent farmers will be organized into production clusters or an association and contracted formally or informally to supply nuts and/or sap to the MSME processor.

Nucleus farm: The nucleus farm consists of own and leased farms and are organic certified. A project management unit of the enterprise (PMU) manages the farm. It also coordinates the procurement of the outsourced farms. It could provide 60% or more of the raw material depending on the stability of outsourced farms. Productivity is higher than other farms by adopting superior varieties and following GAP recommended cultural management practices. These varieties could produce 4 to 8 liters of sap per tree and 150 nuts or more per tree.

The nucleus farm could generate a potential revenue per hectare of Php300,000 per month if it is entirely for the production of coco sap. This is on the following assumptions of yield at 4 liter of sap per tree, a conversion ratio of 8 liters of sap per kilogram of coco sugar, a plant density of 100 trees per hectare and an FOB Manila price of Php200.00 per kilogram of coco sugar. This is twice as much as the revenue from farms using conventional varieties and cultural management practices.

For VCO there is better cost efficiency as regards to cost of raw materials and cost of land. The use of better performing hybrids increase yield per tree from 50 to 100 nuts. This means a 100% productivity improvement and reduction of raw material cost by 38% from Php88.00 to Php64.00 per kilogram of VCO produced.⁹⁶ It also reduces the area of leased farms by 20 percent. This is a conservative estimate given that other improved varieties such as the Vietnam and India varieties which PCA imported for distribution with yield of 200 nuts per tree.

Outsourced farmers: These are farmers with formal or informal contract arrangement to supply nuts and/or sap to the processor-exporter. These farms could also be certified as organic, for GAP and for traceability depending on the requirement of production. The PMU will also supervise and monitor their compliance to the protocols required by the certifications.

⁹⁶ Assumptions: Improvement in recovery ratio from 11 nuts:kg VCO to 8 nuts:kg VCO and a farm gate price of Php8.00.

There procurement systems that could be adopted. One is a profit-sharing scheme with farmers and the other is farmers as co-investors in the processing plant.

Profit sharing scheme: This scheme shares profit of the processing plant to the farmers as long as the farmers supply the required volume at the right quality and time.

1. The MSME with assistance from PCA and an NGO organizes small farmers into production clusters to supply the raw material requirement of the intermediate processing plant.
2. MSME helps landless farmers to lease coconut farms.
3. MSME with the assistance of PCA adopts the intercropping scheme suitable to market conditions in the place of operation.
4. MSME provide inputs on credit, embedded technical and organizational services and superior planting materials for replacement of senile and dead coconut trees.
5. Farmers manage the farm under the supervision of the MSME's project management unit (PMU).
6. MSME provides transport logistics in moving raw materials from farm to processing plant
7. MSME through an NGO and with the assistance of PCA gets the coconut farms relevant certifications.
8. Farmers delivers the nuts and/or sap to the MSME processors as required.
9. Profits distributed to the farmers based on an agreed pricing scheme.

The benefits from this kind of raw material procurement scheme is as follows:

1. Stable supply of competitively priced, quality and adequate volume of raw materials.
2. Enhanced productivity from adoption of right technology, cultural management practices and adoption of improved coconut varieties.
3. Generates more employment and increases income of landless and small farmers.

The other scheme is the Land Bank's Joint Venture Corporative Scheme proposal which is a stock for profit-corporation 49 % owned by farmers and 51 % owned by a medium to large agribusiness enterprise. This links small processors as well as farmers to large main stream markets like VCO and other coconut products and allows them after sometime to be part owner of the corporation. The scheme is as follows:

1. The small farmers will be organized into production clusters which will serve as the nucleus farm of the JVC. JVC will totally manage the operation of the cluster and farm ownership remains with the farmers. Each farmer who will go into an individual farm management agreement with the JVC.
2. The JVC will provide regular employment to participating farmers by involving them in the management of the farms and supporting them to go into forward vertical integration of intermediate product processing.
3. The JVC will distribute 60 % of allowable dividends to farmers pro-rata according to their land area contribution (not according to equity). The income of the JVC is from raw material production to finished products processing.
4. Participating farmers will buy shares of JVC every dividend declaration every month or some other suitable period of time until 49 % of the corporation's shares are owned by them.
5. Land Bank will slowly divest it share in favor of the farmers up to the time that farmers' shares reach 49%
6. The production cluster or nucleus farm will be managed professionally by the 51 % majority owner of the JVC.

This scheme allows farmers to become part owners of the processing corporation. This draws them in to the main stream markets of the VCs that will generate more income for them. Additional benefits such as housing loans, hospitalization and medical care loans and educational loans could further be included in the scheme as further benefits.

Intercropping: An integral part of the VC business model is the intercropping operation to supplement and enhance the income of farmers. The selection of the crop depends on its agronomic suitability, availability of markets for its products and suitability to coconut growing. Choices of crops could rely on suggested PCA crops and observed field practices such as cassava-coconut intercropping in Lanao del Sur and SOCKSARGEN and passion fruit-coconut intercropping in Quezon.

3.3 Coco coir/peat value chain

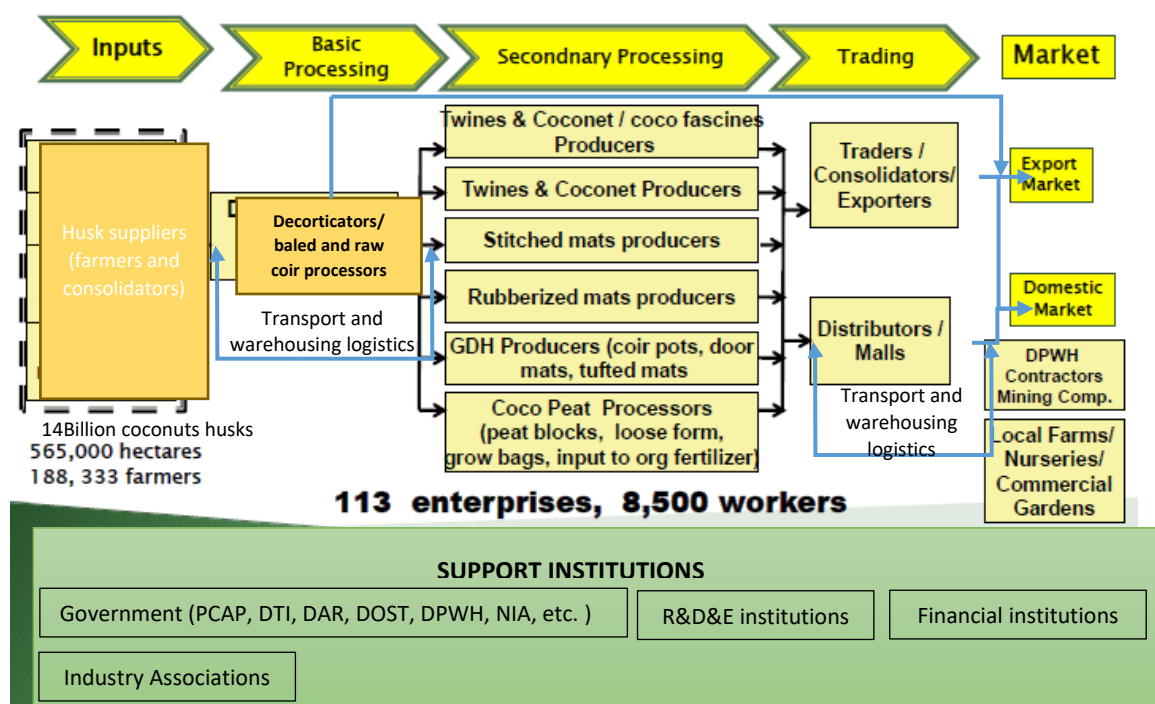
The coco coir value chain is one with many strands as coco coir can be used as raw material to produce many secondary processed products/value-added products. Coconut husks are decorticated, processed into various products including coco nets/coco twines, stitched mats, tufted mats, coir ropes/cordage, organic fertilizer with peat as raw material and peat blocks among others and traded both locally and internationally.

Domestic market includes local farms/nurseries/commercial gardens which make use of the coco coir/peat as growing medium for landscape and other horticultural plants and lawn and golf course grasses, industrial users for rubber coated garden pots and mats, bed mattresses and car upholstery and construction contractors and government agencies such as the Department of Public Works and Highways (DPWH) and the National Irrigation Administration (NIA) and mining corporations which make use of nets, rolls, and mats for erosion control mitigation. The export market, on the other hand, includes China and other parts of Asia and the US for coir geo-textile/coconets/coco fascines, the US, EU and Asia for coir tufted mats, and China, Asia, Europe and the US for coir twines/yarns⁹⁷.

Figure 22 shows the VC map of coco coir/peat showing the processes and key players in the chain and the external support institutions. According to National Coco Coir Inter-Agency Technical Working Group (2014), the industry coco coir/peat value chain in 2014 consists of 113 registered enterprises employing about 8,500 workers nationwide. The processing enterprises consists of processor-exporters and processors serving the domestic market or indirectly exporting through broker-exporters.

⁹⁷ National Coco Coir Inter-Agency Technical Working Group

Figure 22 Philippine coco coir value chain



Source: National Coco Coir Inter-Agency Technical Working Group, 2014

VC processes

Processing⁹⁸. Husks are used as raw material in the production of coco coir and coco peat is a byproduct (**Figure 23**). These materials are waste materials in copra making, VCO production and other processed coconut products that make use of husked nuts. About 10 husks can be transformed into one kilogram of coco coir and two kilograms of peat⁹⁹.

Husking of nuts is either manual or mechanical. The former uses a steel-tipped spike to split the husk and separate it from the nut (seed). On the average, a skilled husker can husk around 2,000 coconuts per day. In contrast, mechanical husker can process about 2,000 coconuts per hour depending on designed capacity. The recommended age of coconut to get the best quality of fiber is 11 to 12 months¹⁰⁰. This is also the age of nuts suitable for copra making and VCO processing.

The husks are prepared for easier decortication through the retting process or just softened up by beating the husks. The first process requires access to water supply adequate for soaking the husks.

⁹⁸ (entrepinoys, 2015)

⁹⁹ Food and Agriculture Organization

¹⁰⁰ (Pilipinas Ecofiber Corporation, 2018)

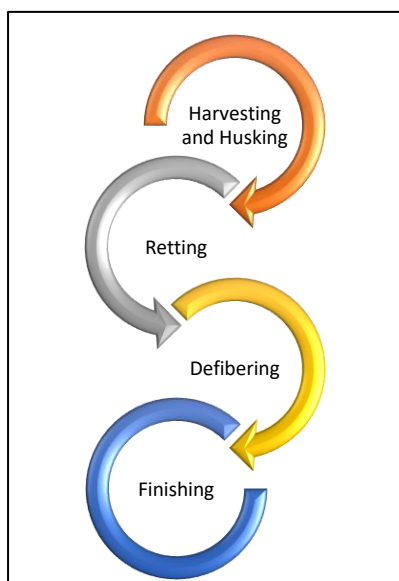


Figure 23. Coco coir processes

The preparation process called retting involves soaking the husks in water for a period of time. Decorticators practice two methods of retting, freshwater retting and saltwater retting, based on the maturity of the coconuts. Saltwater retting uses sea water and/or salinated fresh water as dipping medium. Retting is done along rivers, mouth of rivers and concrete water tanks. Natural retting takes about 6 months to complete. However, some processors use some type of bacteria to hasten up the process.

Retting period is also shortened by using crushing machine. This equipment breaks the husks easily after seven to ten days. It can also crush green husks soaked for a day or two. This process commonly called dry milling, however, produces only the mattress type fiber.

After retting, defibering follows to extract the bristle fibers. These fibers classified as combed fibers have lengths of 20-40 cm. These are considered premium fibers. In contrast, mattress fibers or random fibers have lengths 2-10 cm¹⁰¹.

Defibering is done manually or mechanically. Manually a worker beats or pounds the retted pulp with wooden mallet to separate the fibers from the pith and outer skin. Mechanically this is done by a rotating drum fitted with steel spikes. Clean fibers are spread loosely on the ground to dry in the sun while the residues are washed and combed by hand or tumbled in a perforated drum or sieve.

During the finishing process, the bristle fibers that will not be immediately processed are rolled and tied into loose bundles for storage or shipment. A hydraulic press is used to create compact bales. Mattress fibers may also be baled with a hydraulic press. Depending on the intended final use, baled fibers may be further processed into yarn for mats or nets and twines for rope.

Coco peat or coco dust: is a consequence of the processing of coco coir. This is a waste material that creates disposal problem when it is not processed for commercial sale. Some decorticating plants process coco peat as soil medium either in loss form or compressed¹⁰². There two types of coco peat as to particle sizes and fiber content. One is the short fiber (<2cm) that is around 2%-13% of the total peat produced. The other consists of cork like particles ranging in size from granules to fine dust (0.2-2mm)¹⁰³. The latter commands a higher price in the local market since it has to undergo sieving to separate the short fibers.

Coco coir processing is technology intensive requiring a mechanized processing line. For this reason, only small and medium MSMEs can afford to invest into this type of value chain. The government has provided several assistances to processors like the Department of Trade and Industry's (DTI) coco coir shared service facilities (SSF). The SSFs consist of machinery, equipment, tools, and facility grant, skills, knowledge and entrepreneurs' capability building. For instance, in Camiguin, the Kalipunan ng Liping Pilipina (KALIPI) received the 1.9 million diesel-engine powered decorticating with winnowing/peat screening machine as part of the SSF project¹⁰⁴. As of November 30, 2018, according to DTI it has established a total of 275 coconut/coco coir SSFs in several regions of the country valued at approximately 117 million pesos.

¹⁰¹ (Gesamtverband der Deutschen Versicherungswirtschaft e.V. (GDV), 2002-2019)

¹⁰² (Rimando, 2009)

¹⁰³ (Pilipinas Ecofiber Corporation, 2018)

¹⁰⁴ (Paculba, 2018)

Marketing. Same with the MSME processors of VCO and coco sugar, MSME coco coir and coco peat enterprises rely on business matching events in marketing their products. There are other enterprises who have direct contacts with buyers in the China market who produce for their particular requirement. The NTWG on coco coir is organizing coir summit every two years to link coco coir processors to local and foreign buyers.

E-marketing however is not so popular among the MSME coco coir/peat enterprises. Among the 27 surveyed MSME coco coir/peat enterprises, only two (2) have postings in Alibaba and in Tradekey. Further, only ten (10) or 37% of them have their own websites or Facebook accounts. E-marketing is a good platform for trading since buyers now are relying heavily on internet in searching for products to be bought.

Flow of coco coir/peat products for export is through three marketing channels: (1) thru coco coir/peat processor-exporters who directly export the products to importers, (2) thru trader-exporter including the processor-exporters and processors, and (3) thru brokers/exporters acting as agents to distribute the coir/peat products to importing countries.

Both price and product differentiation drive competition in the global markets. Based on the TRAVERA Enterprise survey, price, product design (for value added products), consistency of product quality, volume and delivery/transportation cost/fee/charge are among the factors influencing buyers' decision in purchasing their products. Product rejection at the border of importing country is an exception. The same survey showed that there was one instance of rejection in China not because of quality issues but of disagreement in product pricing.

Philippine coco coir/peat MSMEs face tough competition from India, Sri Lanka and Vietnam due to price differences.¹⁰⁵ These three countries have lower cost of production than the Philippine processors. India and Sri Lanka are the two top coco coir/peat producer and exporter in the world accounting for about 90% of global export of these products.

Unlike the VCO and coco sugar VCs there is not much certification requirements in coco coir/peat processing except for GMP, fair trade practices and sustainability certifications. For these certifications they make use of the services of Control Union or ECOCERT the only two international certifying service providers in the country recognized by the DTI-Philippine Accreditation Bureau (PAB).

The industry standards for coco coir follow the Philippine National Standards (PNS) set by the DTI- Bureau of Product Standards (BPS). Administrative Orders (AOs) issued by the Fiber Industry Development Authority (FIDA) set the PNS for coco coir. While the PNS for coco peat was adopted from the Draft Import Health Standard for Importation of Coco Peat and Coir Fiber Products of New Zealand.

As of PNS/BAFPS 21:2008, ICS 59.060.10, there are five (5) grades of coco coir classified according to its strength, cleaning, and color:

- a. **Coir good (CH-1)** – highest grade; fiber is of good cleaning with little or no pulp present in the bristle; color ranges from light brown to almost dark brown; length of fiber or bristle shall not be less than 5 inches; and texture is medium harsh.

¹⁰⁵ Gancharo, Elvie Grace & Perla Manapol Coco Technologies: Providing Livelihood Opportunities for Poor Coconut Farmers through Value-Adding. UNDP. Undated.

- b. **Coir fair (CH-2)**- the fiber is of fair cleaning with considerable pulp present in the bristle; color ranges from dull brown to dark brown approaching black; the length of fiber or bristle shall not be less than 5 inches; and the texture is harsh.
- c. **Coir mixed (CH-3)**- fiber is a mixture of fibers of good and fair cleaning generally crumpled and tangled; percent purity shall not be less than 90 percent; the color ranges from light brown to dull brown; texture is medium to harsh; and must be free from coir dust and hard, undefibered portion of the husk.
- d. **Coir mattress (CH-4)**- fiber consists mostly of short crumpled fiber with average length of no less than 2 ½ inches; must be free from coir dust and hard, undefibered husk; generally used for mattress, hence its name.
- e. **Coir waste (CH-W)**- fibers less than 2 ½ inches long and or fibers with partially defibered portion of husk mixed with proportionate weight of coir dust. Predominant coir dust is not included in this grade.

In all grades of coco coir, the minimum requirements are: (1) the coir must be thoroughly dry and shall not exceed 20% moisture content (MC), (2) the coir must be of the same kind of cleaning, and (3) the coir must be free from foreign matters. Other provisions are included for allowed tolerance, baling, and labeling.

For coco peat, six (6) grades are being followed as of PNS/BAFPS 74:2009, ICS 65.080:

- a. **Grade A: Fine special grade**- coco peat sieved finer than 5 mm mesh; at least 6 months old; washed/leached; with pH of 5.5-6.5; electrical conductivity (EC) (1:5 test) of below 0.5mS/cm; and moisture content of $\leq 20\%$. These are mostly used for seed raising substrates and green house hydroponics growing and salt sensitive plants and horticultural potting mixes.
- b. **Grade B: Fine standard grade**- coco peat sieved in 5 mm mesh; at least 6 months old; washed/leached; with pH of 5.5-6.5; EC (1:5 test) of below 1.0 mS/cm; and moisture content of $\leq 25\%$. These are mostly used for seed raising substrates, mushroom grow medium-mix, golf courses, green soil medium mix and special potting mixes.
- c. **Grade C: Standard grade**- unsieved coco peat with approximately 10%-15% short fibers; at least 3 months old; washed/leached; with pH of 5.5-6.5; EC (1:5 test) of below 1.0 mS/cm; and moisture content of $\leq 25\%$. These are exported for potting mixes, hydroponics and soil conditioning.
- d. **Grade D: Partially dried regular grade**- unsieved coco peat with approximately 10%-15% short fibers; at least 3 months old; unwashed/leached; with pH of 5.5-6.5; EC (1:5 test) of below 2.0 mS/cm; and moisture content of $\leq 30\%$. These are mostly used in its pure state for direct application for soil conditioning, increase of organic matter content in upland crops for moisture retention purposes for turf and potting in nurseries.
- e. **Grade E: Regular grade**- unsieved coco peat with approximately 10%-15% short fibers; at least 3 months old; unwashed/leached; with pH of 5.5-6.5; EC (1:5 test) of below 2.0 mS/cm; and moisture content of $\leq 60\%$. Mostly used for the same purpose as of Grade D partially dried regular grade.
- f. **Grade F: Fresh coco dust**- undried; less than 3 months old; with pH of 5.5-6.5; EC (1:5 test) of below 2.5 mS/cm; and moisture content of $\geq 60\%$. These are mostly used in its natural state for direct application for plants with high salt tolerance/high chloride requirement.

In all grades of coco peat, minimum requirements are:

1. It must be clean and free of seeds, pests, soil, animal material and any other contamination;
2. Coco peat processing areas must be free from loose animals such as chicken, dogs, pasture animals, and pets which may excrete manure to the coco peat material;
3. It must be absolutely free from salmonella and E. coli bacteria;
4. It must not be produced from the traditional method of retting husks in open troughs or ponds;
5. Washing or rinsing of coco peat, chips or crush must be carried out with bore clean water with EC of not more than 0.5mS/cm and/or rain water (direct rainfall), pond or dam water free from impurities;
6. Coco peat drying areas must be buffered underneath from contact with soil; and
7. A weed free buffer zone of 3 meters must be maintained around the coco peat drying areas unless concrete walls are built on the perimeter of concrete pads.

Other provisions are included for packaging, sampling and labelling requirements for product lot acceptance. The export market is particular about compliance to these standards. However, in the local market buyers are indifferent and they use informal grading.

Coir and coir value-added products have great market prospects especially in the international market. However, coir production in the Philippines remains very low because of the greater importance given to copra and desiccated coconut. According to the report of the Philippine Coconut Authority (PCA), as cited by Entrepinoys, out of the 14 billion¹⁰⁶ coconuts husks produced in the farm only 10% is processed into coir, 50% is used as fuel in copra production and the remaining 40% is left to rot in the fields. Although, generally, Philippine coconut varieties have bigger kernels and produce lesser fiber compared to India's and Sri Lanka's coconut varieties, the industry is not wanting of supply of husks¹⁰⁷.

MSME coir/peat enterprises face several constraints in exporting their products. Foremost are inadequate market information for market entry and expansion, inability to meet buyers' requirement, tight competition from similar products and substitute products, high logistics/transportation costs, relatively high cost of production, variability in the quality of husks supplied, business and economic risks (e.g. stiff competition), and adverse effect of climate change like typhoons, dry spell (El Nino)¹⁰⁸.

¹⁰⁶ Excoll Assumptions: 50 nuts per tree, 100 nuts per hectare, 3.5 hectares of coconut farms, 80% of husks are available for processing.

¹⁰⁷ (Entrepinoys, 2017)

¹⁰⁸ TRAVERA Enterprise survey, 2018.

Key players in the VC

Processors/Processor-Exporters. As of 2016, based from the list of the Philippine Coconut Authority (PCA), there are 43 suppliers of coco coir and peat products in the Philippines (**Table 52**). These enterprises are mostly multiple-product (i.e., coco coir or coco peat coco charcoal, coco shell scraps, etc.) enterprises. They are mostly concentrated

in Region XI with 35% (15) of the total number of enterprises situated in the region, followed by Region IVA (**Figure 24**). Out of the total number of enterprises, only 10 are processors/manufacturers-exporters: 4 in Region IVA and 2 each in Regions X, XI and XII. The rest are exporters, trader, and trader-exporters. Most of these processors/manufacturers are corporations. Only ND Malaluan Trading in Candelaria, Quezon and Hingyl Coconut Husk Processing Plant in General Santos City are single proprietorships. Leading producer of coco geotextiles for soil-erosion control and river rehabilitation projects in the country is Green Asia Inc. and they also sell coco peat to the export market, about 36 containers of peat to Korea, Japan, and Malaysia¹⁰⁹.

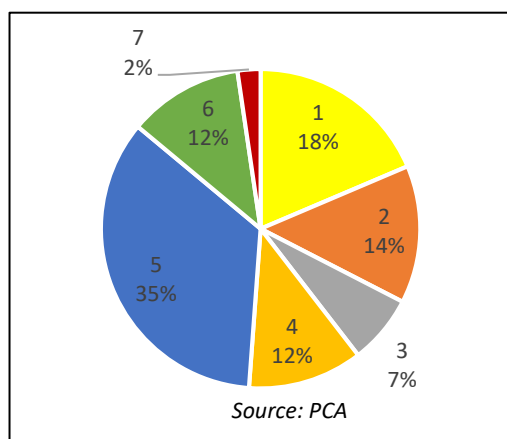


Figure 24. Concentration of coco coir and peat enterprises in the Philippines, 2016

¹⁰⁹ (Joves)

Table 53 Summary of Coco Coir Supplier for the Year 2016

NO.	REGION	NAME OF COMPANY	NATURE OF BUSINESS	PRODUCT LINE	TYPE OF ORGANIZATION
1	IVB	Chemsynergy Asia Inc.	Exporter, Trader	RBD Coco Oil Methyl Ester, Refined Glycerine, Coir Fiber, Coco Fatty Alcohol, Crude Glycerine, Coco Acid Oil	Corporation
2	IVB	Phil Coconut Coir and Peat Manufacturing Corp.	Exporter, Trader	Coco Shell, Coco Charcoal, Coco Fiber, Coco Peat	Corporation
3	IVB	AR5 Transport & Trading Inc.	Trader	Coir, Coco Shell, Coco Shell Charcoal, Buko, Niyog	Corporation
4	IVB	Dignity Products and Services, Inc.	Exporter, Trader	VCO, Coco Water, Coco Milk, Fiber, Shells, Peat, etc.	Corporation
5	IVB	Surco Coconut Processing & Trading	Exporter, Trader	Coco Husk, Coco Fiber, Charcoal & Young Coconut	Single Proprietorship
6	IVB	M.I. Park General Trading Inc.	Exporter, Trader	Coco Peat	Corporation
7	IVB	Coco Technologies Corporation	Exporter, Trader	Coconet, Cocologs, Charcoal, Coco Peat, Garden products/by products	Corporation
8	IVB	Gray Enterprise	Exporter, Trader	Fresh Yoiumg Coconut, Coco juice, Coco Peat and other coco products	Single Proprietorship
9	IVA	Negcolo De Coco Incorporated	Trader	Fresh , Dehusked, VCO, Copra, Coir	Corporation
10	IVA	N.E.P. Co. Inc.	Exporter	Coir Dust, Coco Peat	Corporation
11	IVA	ND Malaluan Trading	Coir Processor	Coir Fiber & Coco Dust	Single Proprietorship
12	IVA	Pilipinas EcoFiber Corporation	Coir Processor-Exporter	Coco Coir, Coco Peat, Processed Coir & Peat Products	Corporation
13	IVA	Tropical Prime Coir Corp.	Coir Processor	Fiber, Twine ropes, Geonets, Biologs	Corporation
14	IVA	Rong Ming Coco Fibers Industries Corp.	Coco Non-Food Product Manufacturer	Coir and Coirtex Pads	Corporation
15	VII	Profood International Corporation	Exporter	Coco Chips, Coco water	
16	VII	Brgy. Liptong Small Coconut Farmers Association, Inc. (BLISCOFA, Inc.)	Exporter, Trader	VCO, Coco Coir, Coco Vinegar	Corporation
17	VII	KIMES Foods International Inc.	Trader	Coconut wraps, Coconut Flakes, VCO, coconut chips	Corporation

18	X	Philippine Coco-Products Enterprises Inc.	Manufacturer Exporter of Activated Carbon	Coco shell, charcoal, coco peat and coco shell activated	Corporation
19	X	High mount International Group, Inc.	Exporter/Trader of Coconut Oil, Cake, Fiber, Charcoal & Young nuts	CNO, Cake, Fiber, Charcoal, Young Nets	Corporation
20	X	Blue Diamond Coconut Fibers & Peat	Manufacturer/Exporter of Coconut Fiber & Peat	Coco Fibers, Coco Peat, Coconet, Cocologs	Corporation
21	X	Cebu Adhesive Trading	Exporter/Trader of Coco Shell Charcoal	Coco shell chips, coco husk, and coco peat	
22	X	Parsenn Lane Inc/	Exporter/Trader of Coconut Coir Fiber	coco coir fiber	Corporation
23	XI	Jags Lucky Fiber	Exporter, Trader	coco coir, fresh coconut, coco shell chips, charcoal, coco shell scraps, coco peat, coco granular, dried coconut food grade and other coco by products	Single Proprietorship
24	XI	Tough D Agri Enterprises	Exporter, Trader	coco peat, fiber, VCO, coco sugar, copra meal, coco water, coco juice concentrate, coco milk cream, coco frond (Palwa), coco shell charcoal, briquette, activated carbon, coco broomstick and other coco by products	Single Proprietorship
25	XI	Prime Coco Shell Inc.	Exporter, Trader	desiccated coconut, fresh young coconut, charcoal, coco shell chips, coco granular, coco peat, coco fiber & dried coconut	Corporation
26	XI	Regwill Industries, Inc.	Exporter, Trader	charcoal, coir products, fresh buko, coco coir, coco peat, coco twine & coco nets	Corporation
27	XI	Green Asia Agri-Ventures, Inc.	Exporter, Trader	coconut & coconut by-products (coconets, cocologs, cocotwine), coco peat, coco seedlings	Corporation
28	XI	RK Star Coir Corporation	Exporter	coir logs, coir fiber, coir peat	Corporation
29	XI	GCF Multi-Products Development Corporation	Exporter	coco coir fiber, copra powder, copra peat, coco charcoal, coco by products, fresh young coconut, coco peat powder	Corporation
30	XI	Midana Resources Corporation	Exporter, Trader	coco fiber, VCO, coconut shell charcoal, coco peat, copra meal, coco water	Corporation

31	XI	Jialin Coco Fibre Collector	Exporter, Trader	coco coir, coco fiber, fresh coconut, coco shell chips charcoal, coco shell scraps, coco peat, coco granular, dried coconut (food grade) & other coco byproducts	Single Proprietorship
32	XI	Jin Qi Xiang Ventures, Inc.	Exporter, Trader	fresh coconut, coir processor, coco husked fiber, coco fiber, coco peat, charcoal, coco shell chipsm coco shell, coco shell granular for water filter, coco shell by product and other coco by product	Corporation
33	XI	Nature's Gain Agricultural Resources, Inc.	Exporter	coco fiber, coco peat	Corporation
34	XI	Gata Trading	Exporter	VCO, coco juice, chips, dried coco meat, coco milk, coco husks, coco soaps and shampoo, conditioner, charcoal, coco jams and other related coco food products	Single Proprietorship
35	XI	Pontmain Resources, Inc.	Manufacturer, Exporter	coco fiber & peat products	Corporation
36	XI	KRD Agro Industrial, Inc.	Manufacturer, Exporter, Trader	coco peat block	Corporation
37	XI	NKM Import/Export Inc.	Exporter, Trader	coco charcoal, coco peat, coco coir, fresh coconut	Corporation
38	XII	Hingyl Coconut Husk Processing Plant	Coir Processor	Coir Fiber & Coco Dust	Single Proprietorship
39	XII	Saranani Cocotech Corp.	Coir Processor	coco coir	Corporation
40	XII	Patwoods Processing, Inc.	Exporter	coco peat	
41	XII	Yumi Golden Field inc.	Exporter	coco peat & coconut by products	
42	XII	Don Bosco Multipurpose Cooperative	Intermediary Exporter	coco peat and other by products	
43	XIII	Kaagap Development Multipurpose Coop (KAAGAPMOCO)	NA	coco coir processing	Single Proprietorship
Source: Philippine Coconut Authority					

Of the 27 surveyed MSME coco coir/peat enterprises, 6 are processors and 6 processor-exporters. Most of these MSME processors and processor-exporters or 5 out of 12 are micro enterprises with assets up to 3 million pesos (**Table 53**). These processors/processor-exporters source out coconut husks primarily from individual farmers although there are also a few sourcing out from consolidators/integrators and traders. Jialin Coco Fiber Collector and Marycheck Corporation, on the other hand, have its own coconut farms to supply husks.

Table 34. Profile of Coco Coir/Peat Processors/Processor-Exporters, TRAVERA Enterprise Survey 2018

No	Region	Enterprise	Function	SME Classification (by Asset Size)	Product/s
1	XIII	CLACOFARMCO	Processor	Micro	Coco coir
2	V	COCOTECHNOLOGIES, CORP. / JUBOKEN ENTERPRISES	Processor-Exporter	Medium	coco peat, coir blogs, coir fiber
3	XI	EFHON MULTI PRODUCTS, INC. / NATURE'S GAIR AGRICULTURAL RESOURCES, INC.	Processor-Exporter	Unclassified	Baled coir, coconut bran, Coco peat
4	XII	HINGYI COCONUT HUSK PROCESSING PLANT	Processor	Micro	baled coir, coco peat
5	X	Malingao Comm. Service Multi- Purpose Cooperative (MCOCO) Enterprise	Processor	Small	baled coir, coco peat, coco net
6	IV-A	MARYCHECK CORPORATION	Processor-Exporter	Medium	baled coir, coco coir, coco dust, coco peat
7	IV-A	PILIPINAS ECO FIBER CORP. (FORMERLY) SORIANO MULTI-PURPOSE FIBER CORPORATION	Processor	Medium	baled coir, pads/liner of coir, coco peat, coco pots, bio trays
8	IV-A	SAZON COCO FIBER INDUSTRIES	Processor	Micro	coco dust, coco fiber
9	NCR	TROPICAL PRIME COIR CORP.	Processor-Exporter	Micro	baled coir, coir blogs, coco dust, coco peat, geonet, coir fiber
10	IV-A	WUA YEI ENTERPRISES	Processor-Exporter	Medium	Baled coir, coco peat
11	XII	YUMI COLDEN FIELD INCORPORATION / OZ WISPHIL TRADING CORPORATION	Processor	Unclassified	Coco peat
12	XII	ZHEN PENG TRADING (SISTER COMPANY OF HING YI COCONUT HUSK)	Processor-Exporter	Micro	baled coir, Coco peat

**Classification by Asset Size: Micro (up to P3M), Small (P3,000,001 to P15M), Medium (P15,000,001 to P100M), Unclassified (no information provided)*

Source: TRAVERA Enterprise Survey, 2018

Other enterprises are more community development oriented like Pilipinas Ecofiber Corporation (PEC or Pilipinas Ecofiber). It is a medium-scale processor of coir and peat and other coir/peat value-added products, engaged in community partnerships. PEC is helping the low-income communities of coconut farming households primarily located in the Bicol Region by providing technical and business support. Currently, they have partnerships with two community organizations in Camarines Norte: the Coconut Integrated Farmers Association (CIFA) in Labo and the Fabrica Small Coconut Farmers Organization (FSCFO) in San Vicente.

In 2016, PEC set up a decorticating machine for FSCFO which can process 15,000 husks per day using a single-pass decorticating process. PEC also committed to purchase FSCFO's production of coco fiber and cocopeat and to train them in twining and weaving of coco fiber. It also committed to provide decorticating machine to CIFA which can process 5,000 husks a day and to engage them in twining and weaving as well. DSWD "4Ps" beneficiaries were trained in early 2017 how to make coco ropes which it bought. This is to help them to be less dependent on the government (**Figure 25**).

Farmers. These are individual and organized coconut growers that supply husks to coir/peat processors. They either deliver the husks to the production site or hauled the husks to the roadside to be picked up by the processors. The husks are waste materials from copra making and from the production of nuts that are delivered to desiccated and VCO processing plants. In 2014 the NTWG estimated that there are about 188,333 farmers

that are supplying the coir value chain. These farmers cover around 565,000 hectares with a potential husk output of 2.825 billion. This means that farmers go beyond their farms to collect and supply husks.



Figure 25. Community partnership of Pilipinas Ecofiber with the Fabrica Small Coconut Farmers Organization (FSCFO), 2016

Trader-exporters and broker-exporters. The trader-exporters and broker-exporters serve as the middlemen between the processors and the export market. They buy coir/peat products from processors, consolidate them and sell to importers. Aside from coir/peat products, they also carry other products such as fresh coconut, coco shell chips, and charcoal among others taking advantage of economies of scope. **Table 55** shows the profile of trader-exporters and broker-exporters based on the TRAVERA Enterprise Survey (2018).

Trader-exporters and broker-exporters are mostly corporations (69% of the total exporters listed in PCA in 2016). Results of the TRAVERA Enterprise Survey

showed that MSME coir/peat exporters are dominantly micro enterprises or 7 out of 15 based on the size of their assets.

Trader-exporters and broker-exporters are also able to take advantage of free trade agreements of the Philippines with other countries. Five of the surveyed coco coir/peat exporters are enjoying privileges from ASEAN Free Trade Agreement, ASEAN-Australia-New Zealand Free Trade Agreement, ASEAN-Republic of Korea Free Trade Agreement, ASEAN-China Free Trade Agreement, Philippine-Japan Economic Partnership Agreement, Philippine-European Free Trade Association, European Union Generalized Scheme of Preference Plus, and United States General System of Preference.

Table 54. Profile of Coco Coir/Peat Exporters, TRAVERA Enterprise Survey 2018

No	Region	Enterprise	Function	SME Classification (by Asset Size)	Product/s
1	NCR	ARAMA CORPORATION	Exporter	Unclassified	Coconut peat powder
2	IVA	HANCOLE CORPORATION	Exporter	Small	coco peat
3	XI	JAG'S LUCKY FIBER	Exporter	Micro	Coco coir, fresh coconut, coco shell chips, charcoal, coco shell scraps, coco peat, coco granular, dried coconut (food grade)
4	XI	JIALIN COCO FIBER COLLECTOR	Exporter	Micro	baled coir, other raw coir, coco dust, coco peat
5	XI	JIN QI XIANG VENTURES INC.	Exporter	Small	baled coir, coco fiber, coco peat
6	XI	JL SOUTHMINE COCO FIBER INDUSTRY INC.	Exporter	Micro	coco peat, coco fiber
7	XI	LDM SUMMIT EXPORTER INC.	Exporter	Micro	Coco coir, fresh coconut, coco shell chips, charcoal, coco shell scraps, coco peat, coco granular, dried coco food
8	XI	LIMIN BIOPEAT, INC.	Exporter	Small	Coco peat blocks
9	IV-A	NEPCO, INC.	Exporter	Small	Coir dust, coco peat
10	XI	RK STAR COIR CORPORATION	Exporter	Unclassified	other raw coir, coir bolls, coco peat
11	NCR	TOUGH D AGRI ENTERPRISES	Exporter	Unclassified	baled coir, coco dust, coco peat
12	XI	V-CASTEL TRADING / MODANA RESOURCES CORPORATION	Trader/Exporter	Micro	coco peat
13	XI	FULLFINE AGRI TRADING	Exporter	Micro	coco peat
14	X	HIGHMOUNT INTERNATIONAL GROUP INC.	Exporter	Small	coco coir
15	NCR	ICSEM TRADING	Exporter	Micro	coco fiber, coco peat

**Classification by Asset Size: Micro (up to P3M), Small (P3,000,0001 to P15M), Medium (P15,000,001 to P100M), Unclassified (no information provided)*

Source: TRAVERA Enterprise Survey, 2018

3.3.1 Dynamics in the MSME coco coir/peat value chain

Processors in the coco coir/peat VC are mainly MSMEs. Their processing plants are relatively small in scale or capacity and the level of technology is relatively inferior compared to processors in India and Sri Lanka. Their basic product is coco coir with some commercializing coco peat as a by-product.

Aside from baled and raw coco coir the processors forward integrate into twine, geonets and geotexts, essential materials in soil erosion control. Coco coir is a raw material in the production of value added materials with applications in the agricultural, horticultural and industrial sectors. Value-added processors are separate enterprises that specializes on particular product types such as coco peat based organic fertilizer and rubberized mats and horticultural pots. The main products for export are baled coco coir, raw coco coir and peat in loose and compacted forms.

The processors source husks directly from farmers and husk consolidators who are buying agents of a processing plant. The former however, is the dominant supplier and there are only few processors who depend on traders for their husk supply. The processing plants are located at the coconut farm level because of the bulkiness of the raw material and the high cost of transport. The usual collection radius for husk procurement is 50 kilometers away from the processing center. Processors depending on location buys at about PhP0.30 to PhP1.50 per husk¹¹⁰. A farmer therefore, earns about PhP1,200 to PhP7,500 per hectare from selling husks. However, variability in quality and access to the husks constraints efficient collection and handling.

The industry does not use a common standard for processing line equipment since adoption of customized processing line is the practice¹¹¹. For this reason there is much variability in quality that prevents consolidation of supply to satisfy large orders beyond plant capacity. Moreover, prices vary from one processor to another due to differences in efficiency.

The processors sell both in the domestic and export markets. The major destination of export in 2017 is China which account for 69%, 97% and 82% of exported baled coir, raw coir and coco peat. With a concentrated market the industry is highly susceptible to demand shift risk such as economic slowdown. India, Sri Lanka and Vietnam also competes with the Philippines in China. These countries have competitive edge over the Philippines because of their lower prices and their proximity to China. Goods can be shipped by sea, air, rail or road from India to China and by road and sea freight from Sri Lanka.

The domestic market sales are mostly for government projects and for the mining industry. These are mostly environmental mitigation products (i.e., geonets, geologs). Presidential Memo 25 of September 2001 mandates the use of coco products in all government infrastructure projects. This was further widened to include the NIA and the participation of other government agencies in the implementation of the Memo. Although government has supported the market for coco coir products locally, the slow and delayed payments from government have discouraged the participation of more processors¹¹². Usually coco coir products traders are the suppliers for these projects.

3.3.2 *Measuring quantity and quality of employment in the value chain*

Employment: The processing of coco coir creates 0.14 FTE/MT of finished product. At the farm level, dehusking generates 0.07 FTE/MT of coco coir while at the processing level coir processing creates 0.06 FTE/MT (**Table 56**). This does not include the FTEs in the downstream side of the value chain which generates additional employments from value addition. Examples are making of twines, weaving of geonets, making of geologs, manufacturing of tufted mats and other rubberized coco coir products, and producing coco peat based fertilizers and compressed coco peats. How much FTEs these value adding activities generate is not known. A separate study could be done to determine the jobs generated in the VC, to identify the constraints of job generation and to recommend interventions to address these constraints to improve job generation in the VC.

¹¹⁰ TRAVERA Enterprise Davao City Validation Forum, December 2018.

¹¹¹ KII with Engr. Florante Dagaas, inventor and designer of decorticating and other agricultural related machineries, 2018.

¹¹² TRAVERA Enterprise Davao City Validation Forum, December 2018.

	Activity	PD/MT	FTE/MT
1	Dehusking	21.96	0.07
2	Collection	4.00	0.01
3	Coir production	18.38	0.06
	Total	44.34	0.14

Assumption: 10,000 pieces husk = 1 MT coco coir

Source: *Coconut Industry Value Chain Study, BAR, 2018*

As far as the participation of women and out of school youth in the work force is concerned, the value addition value chain provides employment for these groups of workers. For example, Coco Technologies in the Bicol Region has 85% women as workers.¹¹³ They work in the twining and weaving operations of the company. However, there are much more male workers in coco coir/peat production since more heavy work is involved. In the TRAVERA Enterprise survey male workers in the coco

coir/peat production outnumber women workers by 6:1.

Farmers as well as rural community families and workers also earn additional income from selling husks. In 2006, Coco Tech bought husks from farmers at US\$0.03/husk and pays decorticators US\$3 to US\$5/day, twiners at US\$5.00/day and weavers at US\$2/day (2 weavers per loom).¹¹⁴ A twiner could earn about US\$100 a month working at 20 days a month. If family members of the twiner are working as weavers the income of the family from coco coir value addition reaches up to about US\$180.00 per month.

In 2018, there are about 498 workers employed in coco coir and peat processing. More than half are male workers and only 18% are female workers. Most of the workers are regular (36%) and contractual (30%) employees, while the rest are probationary (21%), casual (10%) and seasonal (3%).

For the past three years, there has been an increase in the number of persons employed in coir and peat processing. From 332 workers in 2016, the number of employees increased to 498 attributed to the increase in coir and peat production. The proportion of regular employees to the total number of employees also increased from 31% in 2016 to 36% in 2018 indicating an improvement in the status of employment of the workers since regular employees are entitled to company benefits. Further, although still small in proportion relative to the male employees, women employment has improved through the years as indicated by the increase in the number of hired women from 54 in 2016 to 88 in 2018.

¹¹³ Ganchero, Elvie Grace & Perla Manapol. Coco Technologies: Providing Livelihood Opportunities for Poor Coconut Farmers through Value Adding. UNDP. Undated.

¹¹⁴ Ibid.

Table 56 Employment in Coco Coir and Peat Processing by Type from 2016-2018, Philippines

Employment Type	2018				2017				2016			
	%	Total	M	F	%	Total	M	F	%	Total	M	F
Regular	36	180	150	30	29	112	96	16	31	104	90	14
Probationary	21	106	65	41	26	100	60	40	30	100	60	40
Casual	10	48	35	13	4	16	16	0	4	12	12	0
Contractual	30	148	144	4	37	144	141	3	30	100	100	0
Seasonal	3	16	16	0	4	16	16	0	5	16	16	0
Total	100	498	410	88	100	388	329	59	100	332	278	54

Source: TRAVERA survey

Recruitment. Employees in coco coir and peat processing are directly recruited by companies through formal recruitment process. Coco coir and peat processors seldom recruit through informal channels or means (i.e. through farming communities, informal groups of farmers or word of mouth referrals) except for production and processing-related jobs such as packaging, labelling, product development, product design, food safety, etc. and logistics and transportation-related jobs involving delivery of goods, transport of goods, etc. Sixty-six per cent of enterprises surveyed said that they experience difficulty in recruiting high-skilled workers.

Length of work contract. Regardless of the employment type, most of the coco coir and peat processors do not have formal written contracts with their employees. But those who have written contracts with their employees have established employee-employer relationship. Contracted or seasonal workers mostly have work contracts of 5 months and below but with renewal depending on the need of the company. However, more than half of coco coir and peat processors do not regularize workers, citing seasonality of business and significant increase in labor cost as their top two reasons for not doing so.

Skills and Training. The level of skills in the coco coir/peat VC is higher compared to the VCO and coco sugar VCs. Skilled workers are needed in twining, weaving, operating and maintaining machineries and equipment and quality control. Twining is either done manually with a simple machine or entirely mechanized for large scale operations. Weaving uses hand looms operated by weavers and is seldom mechanized. The skill level is higher than in twining.

However, in spite of these skills requirement employees are hired even without prior work experience. This implies scarcity of workers with these skills in the areas where the processors are operating.

Coco coir and peat processors provide trainings to their workers. Workers are provided with trainings internally conducted or organized by the companies, trainings sponsored by government, industry association, or academe and trainings provided by outside consultants and/or product supply dealers. Training providers include Department of Science and Technology (DOST), Department of Agriculture (DA), Department of Trade and Industry (DTI), Philippine Coconut Authority (PCA), Department of Agrarian Reform (DAR), and Phil Coir among others. However, in providing trainings with the workers, the coco coir and peat processors experience difficulties due to lack of information on skills training/courses, lack of available/competent skills trainers, low quality of courses being offered/low quality of trainers, difficulty in funding the training, and difficulty in selecting the right people for training.

Working conditions including occupational safety and health. The TRAVERA survey results (Table __) show that more than half of coco coir processors provide bonuses, paid holidays and health insurance to their workers while other benefits such as flexible hours, product discounts, and profit-sharing are not widely practices among these enterprises.

Base: Sample enterprises	(29)
	%
Bonuses	76
Paid holidays	72
Health insurance	59
Flexible working hours or “flexitime”	38
Discount on products	10
Disability insurance	24
Life insurance	21
Profit sharing	10
Others	-
No information	3

Meanwhile, 79 per cent of coco coir processors participating in the survey reported that their workers – whether regular or otherwise – are registered with the national security and insurance systems. Enterprises also indicated that they do not face any concerns in terms of compliance with national labour regulations.

Conformance to labor standards is high among the processors. However, occupational safety and health standards are major concerns. Like the VCO and coco sugar VCs, occupational safety and health hazards in coco coir processing may be inferred from the nature of work, processes and facility. The activities of coco coir/peat processing are routinary and therefore, workers may experience boredom. The risk of accident is relatively high in the husk preparation and decortication wherein workers have to contend with moving parts of processing equipment. Dust is a health hazard in the absence of a dust collection cyclone in the working area. Fire is also another hazard on workers’ safety because of the combustibility of the products. CocoTech a coco coir/peat and value added husk product processor in the Bicol region experienced one of its processing plants was afire. In the TRAVERA survey, 55 per cent of coco coir processors note that their workers experienced work-related injuries or illnesses.

The most common measures of occupational health and safety provided by majority of the surveyed coco coir processors are (1) fire protection and control; (2) materials handling and storage; and, (3) personal protective equipment and devices. Fewer enterprises, however, reported having measures on setting up of safety and health committee; protection from pesticides and fertilizers; machine guarding; and on notification and keeping of records of accidents and/or occupational illnesses.

Labor relations. As characteristic of the industry, coco coir processors also said that their employees do not have Collective Bargaining Agreements (CBAs) and are not part of any union or worker’s organization except for the employees of Pilipinas Eco Fiber Corp. (PEFC) formerly Soriano Multi-Purpose Fiber Corporation. PEFC’s operation is larger compared to the other processors and the number of workers meet the labor requirements for workers’ organization formation.

3.3.3 Constraints in the value chain

The Coco coir and coco peat value chains face challenges in its various processing nodes that impact on its performance in the domestic and export markets.

Processing: The major concerns in processing are the following: 1) the efficiency of decorticating machines, 2) relatively small capacity of MSME coco coir processing plants, and 3) access to more modern decorticating equipment.

Most of the processors use double or triple pass machines with only a few using the more modern single pass equipment. A KII with a decorticating machine engineer disclosed that the best machine is single pass. The output is twice that of a double pass machine and the quality is much better (i.e., longer fibers extracted). The decorticating machines are not standardized since these are customized fabrication and therefore, quality and output varies. In the Davao TRAVERA validation forum, RK Coir Star Corporation was not able to meet large orders beyond its plant capacity because of variability of quality of coco coir from other processors. It designed and developed a single pass decorticating machine which produces better quality fibers than those produced by other coco coir processors.

The capacity of MSME coco coir is relatively small compared to the capacities of Indian and Sri Lankan processing plants. For this reason, they could not satisfy large orders from foreign buyers. For example, FSCPO, a micro coco coir processing plant, uses a machine with a capacity of 2,000 husks per hour with an output of 1.5 MT of coco coir from 15,000 husks that it processes per day. In India most processing plants have capacities of 5 MT of coco coir per day or an input of husk of 50,000 pieces per day. With better economies of scale and a lower labor cost, India outprices the Philippines in the export market.

The processing line of coco coir processing includes several equipment. There are the hammer mill, decorticating machine, rotating sieve, dryer and baler. The cost of this set of equipment runs into millions of pesos. The cost of decorticating machine which is the heart of the processing line varies with capacity and model. The PCA-ZRC model single pass decorticating machine with a capacity of 5,000 husks (0.50 MT) per day and powered by an 18-HP diesel engine costs around PhP350,000.00. Decorticating machine advertised in Alibaba have prices ranging from US\$3,000 to US\$30,000 per set based on capacity and features. Higher capacity machines are beyond the means of MSMEs the reason why they opt for lower plant processing capacities.

Marketing Tight competition from India, Sri Lanka and Vietnam is the major constraint faced by Philippine coco coir/peat processors. Aside from being non-competitive in price, processors do not have the volume to meet large orders because of limited plant capacity. Moreover, the decline in the economy of China which is the main market for coco coir, caused substantial drop in demand causing other processing plants to close shop¹¹⁵.

Higher cost of production is translated to non-competitive price in the market. The driver of costs are the quality and volume of supply of husks, efficiency of the processing line and economies of scale.

The component of cost is the cost of husk, collection and delivery of husk, processing cost, and logistics (i.e., warehousing/inventory and shipping costs). The recovery of fiber from Philippine husk per nut is lower compared to India making Philippine coco coir cost

¹¹⁵ TRAVERA Enterprise Survey Davao City, December 2018.

per unit output higher. Moreover, due to inadequate economies of scale the country's processing cost is higher. India has larger processing plants with economies of scale and these are fully mechanized. Transport cost is also higher considering that India, Sri Lanka and Vietnam are near China and are connected by land transport. These are the reasons why the country's coco coir is outcompeted in the export market.

In the domestic market, although government has mandated the use of coco coir products in all government infrastructure projects, the slow and delayed payments have discouraged some processors to participate in government projects.¹¹⁶ There is also low awareness in the use of coco peat in the local market as a soil conditioner for horticultural crops and agricultural crops. Moreover, utilization of coco peat as a base material for organic material is still in its nascent stage.

Husk procurement. The constraint in husk procurement is collection and stable supply of husks. Collection is limited by access to plantation areas due to poor road infrastructures. Moreover, farmers who produce copra use the husks as fuel for drying. Other farmers are indifferent of gathering the nuts to supply the coco coir processors but instead use the husk as household fuel.

Variability in quality of husk is also a problem since farmers do not harvest sometimes fully matured nuts especially if they are in need of money. They harvest earlier than necessary so they can sell the nuts earlier.

The gaining popularity of coco water and coco sugar is an emerging challenge to coco coir processors. In the former, the preference is for young nuts since their coconut water is suitable as a beverage. In the latter, the inflorescence are used and thus prevents the tree from bearing fruits. However, their impact depends on the rate of their growth and development.

3.3.4 Practical recommendations

Achieving competitiveness requires interventions to address the identified constraints in the Coco coir/peat value chain. As mentioned in the VCO and coco sugar VC discussions, competitiveness is the way to achieve the generation of employment and creation of quality work life and decent jobs. Profitable and sustainable business operations have the potential to grow over time and expand their operations at the same time have the resources to create a working environment that encourages higher productivity of workers.

Addressing the constraints therefore, is a must to attain competitiveness and the socio-economic goals of the enterprises' value chains. These include addressing marketing, processing and raw material or husk procurement constraints (**Table 58**). The need to coordinate the various processes is also necessary for a more effective response to market requirements and changes. Refer to the recommendation on the establishment of an MIS system to coordinate value chain activities in the VCO section.

Marketing: For the coco coir/peat VC to be competitive in the export market it has to address the key problem of price competitiveness and volume. As far as quality is concerned Philippine coco coir products can compete with those from India and Sri Lanka.

¹¹⁶ Op cit, Gancero et al and TRAVERA Enterprise validation forum, Davao City, December 2018.

Table 58 Recommended interventions to address marketing concerns in the coco coir/peat VC output and impact on employment and quality of work

Constraints	Interventions	Output	Impact on Employment and Quality of work
1. Concentrated market.	<p>Diversify to other markets to widen the market base. The industry should further explore Asia-Pacific markets such as Japan, South Korea, Malaysia and Australia, European markets such as Germany, UK and France, the US and the African-Middle East countries of Abu Dhabi, Qatar, Kuwait and Saudi Arabia.</p> <p>Diversify more to value addition. Data shows that the value from these products surpass the value of exported raw products.</p> <p>Explore the adoption of peat moss and geonets and geologs in Middle East countries. The former could be used as a substitute for peat moss the soil conditioner material extensively used in landscaping, horticultural and agricultural applications. The latter could be extensively used to arrest desertification and prevent erosion.</p>	<p>Wider market base that include both domestic and export markets.</p> <p>A wider market base due to a diversified market reduces marketing risk inherent of a narrow market.</p>	<p>A wider market base or more demand requires corresponding increase in production. This will trigger expansions of present processing plants and the entry of new ones resulting to more employment along the VC.</p> <p>A wider market base in the export market exposes more MSMEs to global GAP, HACCP, GMP, traceability, fair trade and sustainability standards that improves the quality of employment and work.</p>
2. Price competitiveness	<p>Achieve economies of scale in production and adopt productivity enhancing technology or equipment. Government could provide incentives for expansion and technology adoption given the presence of a market.</p> <p>In the procurement of nuts, processors develop husk collection clusters that will segregate and collect husks in a way that volume and quality of supplied husks are maintained.</p> <p>Cost could go down with improved productivity both in processing and procurement of nuts.</p>	<p>Competitively priced coco coir/peat products due to improved productivity and enhanced processing plant efficiency.</p>	<p>Competitive MSMEs has the potential for growth with consequent enhancement of agribusiness operations such as the development of more networks and the institutionalization of quality standards not only in products produced but also on the processes and working environment.</p>
3. Inadequate supply volume to meet large orders.	<p>Standardization of quality through the adoption of quality and productivity enhancing technology. This will allow industry order consolidation to enable to satisfy large orders. Another is achieving</p>	<p>Standardized technology in decortication. Economies of scale in production.</p>	<p>By creating productions networks MSMEs achieve economies of scale that generates more employment and improve quality of work through the adoption of more modern technology.</p>

	economies of scale to have higher production output and lower cost.		The use of modern technology reduces the risks of accidents related to processing activities hazards such as in decortication and peat processing.
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Processing: The constraints in the processing node interconnects with the constraints in marketing. High price for example is a consequence of poor processing and raw material efficiency. The constraints in process include inadequate efficiency of decortivating machines, lack of economies of scale and access to modern decortivating machines. This has been discussed in the preceding section. However, with regard to access to decortivating machines a more intensive R&D&E should be done by government and industry researchers to improve efficiency and the quality of output.

In the short term, processors could acquire imported technology from India and/or China. These could then be tested in AMTEC of the UPLB and further improved through reverse engineering.

With regard to economies of scale, an enterprise could set up processing plants at different locations to address the problem of transport logistics and quality variability. With more strategically located processing plants rather than having a central processing center, collection is facilitated as well as variability in quality is addressed.

PCA's program of promoting the use of portable decortivating machines should be strengthened. This program has the potential to include farmers in value addition and mains stream coco coir/peat VC. It also reduces transport cost by transporting higher valued coco coir/peat rather than husks to consolidation centers.

Farmers forward integrating to farm level decortication increases their income as well as generate more employment in the countryside. Providing also twining machines at farm level further increases value addition that benefits the farmers and people in the rural community.

Procurement of husks: This process in the VC chain is very important in determining the quality and cost of finished products. Variability in quality is translated into poor quality of fibers as well as higher cost of raw material. Inadequate supply on the other hand leads to below capacity operation which again increases cost of production and opportunity cost in terms of lost sales.

Processors could go into informal or formal contract arrangement with farmers for the collection and sorting of husks. The agreement sets the price, volume and delivery schedules. The enterprise provides the transport logistics in moving the husks from a central collection center to the processing plant. With a stable market, farmers will be encouraged to form themselves into collections centers for husks. Farmers' family members could also be hired for the value addition processing if this is included in the coco coir/peat enterprise's operation.

This collection center could be integrated into the forward vertical integrated operation of farmers in primary decortication and twining. A network of farmers'

consolidation and primary processing centers connected to a primary or central processing plant can create economies of scale that favors the generation of employment.

Processors could also partner with desiccated coconut and VCO farmers or processor for supply of husk. Desiccated coconut and VCO production requires mature nuts the husks of which are best for coco coir processing. A VCO processor that vertically backward integrate in coconut growing with 200 to 500 hectares could supply about 800,000 to 2.5 million husks a year. This could produce about 64 MT to 200 MT of coco coir per year.

3.3.5 Recommended coco coir/Peat business models

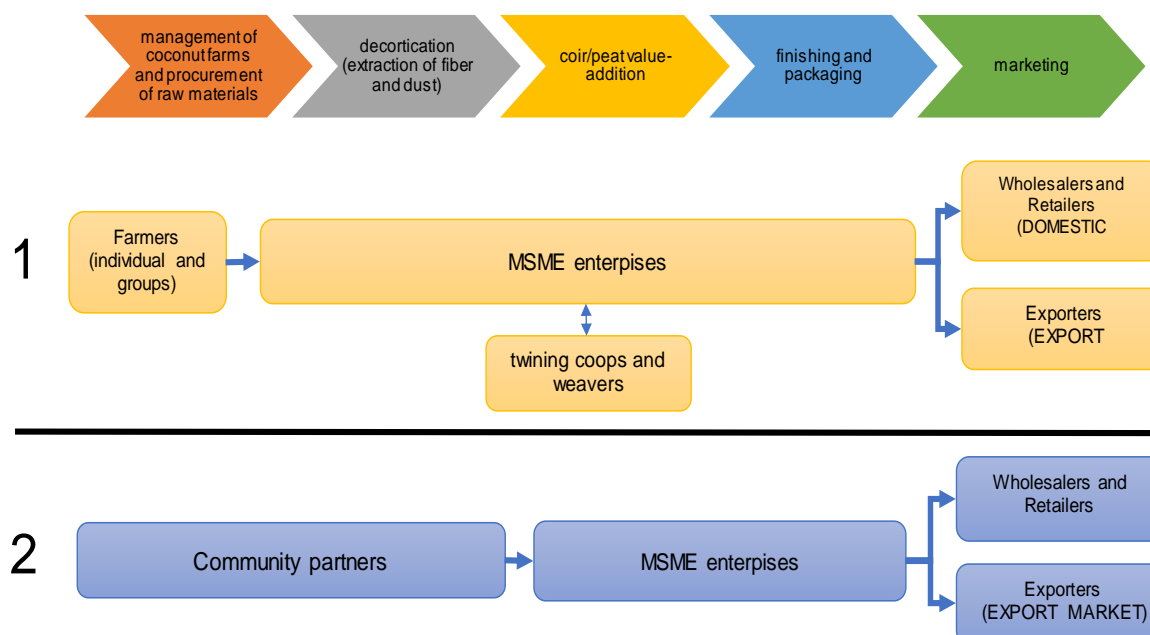
Model structure

The proposed business models follow the standard processes in coir/peat production. Two business models are proposed for the coir/peat VC (Figure 26).

- (1) In the first model, farmers will supply the husks to decortivating plants (MSMEs). The MSMEs will be the one to decorticate the husks to produce coco fiber and coco peat. Some will be packed as baled coir and compressed peat while others will be further processed into ropes, twines, and geo-nets. Twining and weaving will be at enterprise level but the workers that will be hired are from the community involving the women and the IPs if present in the area of operation to generate employment in the neighborhood. The MSMEs also outsource twines from communities and act as integrators of raw materials for weaving and other value added processes. Finished products will be sold in the local and export markets.
- (2) In the second model, defibering and further processing (i.e. ropes and twines) will be done in the farmers-level and coirs, peat, and value-added products will be sold to the enterprises for finishing, packaging, and marketing. The farmers in this model are organized and will be provided with decortivating machines and technical support to train them in the production of value-added products such as ropes and twines. This is more of a community-based integrated processing giving opportunity to farmers to forward integrate into value addition.

The advantage of this model is that logistic costs are reduced since husks will be decorticated and further processed at the farm-level/community-level and more employment in the community will be generated. Further, community partners will earn more because coir fiber and coir dust commands higher price than raw coconut husks. This model, however, requires close and efficient coordination between the community partners and MSMEs to ensure the quality of products produced.

Figure 26. Coco coir/peat Proposed Business Models



Processing. This includes both the primary processing and secondary processing. Primary processing involves the defibering of coconut husks to produce coco fibers/coir and coco peat as by-products of coir production. Secondary processing, on the other hand, involves the transformation of coco fibers/coir and coco peat to value-added products such as geonets, ropes, twines, bed mattresses, carpets, pots, and bio-engineered fascines for coir and fertilizer, growing medium, and animal beddings for coco peat. Both levels of processing involve product standardization to meet the market standards. At the least, the MSMEs will ensure that the Philippine National Standards will be followed for the fiber and peat production for ensure competitiveness.

Since the major constraints in the existing coir/peat VC model are the efficiency of the decorticating machines, relatively small capacity of MSME coco coir processing plants and (3) access to modern decorticating equipment, the proposed VC model encourages the MSME enterprise to partner with the Foundation for A Sustainable Society Inc. (FSSI). FSSI is a social investment organization committed to support the development of sustainable communities through social entrepreneurship. Specifically, FSSI (1) provides financial services and grants to social enterprises¹¹⁷ with triple bottom lines integrating economic, social and environment dimensions in development; (2) support enhancements for entrepreneurial capacities; and (3) helps social enterprises and communities through advocacy and dialogue among policymakers and communities. The FSSI has a program called COCOBIND (Coco Coir Business Integration and Development program) from which the MSME enterprise can borrow a minimum of P500 thousand (maximum of P5.0 million for first time borrowers) for the purchase and installation of modern decorticating machines. Interest rate is 90-day TBill Rate + (5-Project's EEI rating) + Service Fee + VAT with maturity of one to five years and monthly/quarterly/semi-annual/annual

¹¹⁷ Social enterprises are enterprises with a social mission aiming at poverty reduction and wealth creation to facilitate the entry of the poor as partners in achieving sustainable development. These enterprises engage poor communities through transactional and transformational models that teach, enable, and empower poor communities to participate effectively in the creation of sustainable local economies and ecosystems (http://fssi.com.ph/wp-content/uploads/2011/11/FSSI_Brochure.pdf)

payments of principal and interest. COCOBIND aims to contribute to the creation of business and employment opportunities for the coconut farmers and their families and to contribute to the further development of the coco coir industry in the country¹¹⁸.

Alternatively, the MSMEs may also engage in SSF projects of DTI for them to improve their competitiveness by receiving upgraded machinery, equipment, tools, systems, skills, and knowledge under a shared system. However, this program limits the scale of the processing machineries and needs to be supplemented for bigger scale processing.

Marketing. The enterprise will cater both to the local and the export markets. Whether direct or indirect exporting would depend on the capacity of the enterprise. Others who are not yet capable to export, will channel their products through broker-exporters. Direct export will be through B2B transactions from business matching activities and other e-marketing platforms. E-marketing is encouraged to widen the scope of advertising.

Market scoping is needed with the assistance of DTI and industry associations. Getting commitments from ready buyers facilitates production operations and builds the capability of the enterprise for larger production and product diversification.

Procurement of raw materials. The MSME will outsource its raw materials both from community partners and individual and organized farmers with and without formal arrangements. Community partners include marginalized communities being supported by MSME. The MSME will closely coordinate with the outsourced farms the volume, quality standards, price, and delivery schedule to ensure stable and quality supply of raw materials.

3.3.6 Impact on employment and quality of working life and decent jobs

The vertically integrated operation of the business model which draws in farmers to the coco coir/peat VC generates more community based employment, improves quality of working life and creates more decent jobs. Being export oriented and social based inclined certifications on GMP, ISO, fair trade and sustainability are a must to enter importing countries' requirements. Achieving competitiveness and being socially oriented enterprises regards workers as competitive assets and not as source of costs generation. Good working conditions for higher productivity and equity in the value chain are therefore main goals of this VC model.

¹¹⁸ <https://businessdiary.com.ph/3285/coco-coir-business-integration-and-development-program-cocobind/>

Implications of the recommended 3NTCP models on quality of work and employment generation

VC Processes	Features	Quality of work	Employment
Marketing	<p>Linkage with other processors for consolidated supply.</p> <p>Collaborative marketing with other industry players and government for strategic marketing such as continuous product development, entering new markets and expanding in existing markets.</p> <p>Conformance to traceability, food safety, quality of work and sustainability rules and regulations as means of differentiation.</p>	<p>Being export oriented requires conformance of enterprises' value chain to food safety, traceability, quality of work and sustainability rules and regulations.</p> <p>Global GAP, GMP, HACCP, and JAS are just some of the certifications required of exporters before their products are allowed entry to importing countries such as those in the EU, Japan, USA and others. These certifications require that enterprises conform not only to food safety requirements but also to establishing good working environment and conditions.</p> <p>Adherence to Child Labor free certification as required by importing countries particularly in the EU and US.</p>	<p>Entry to new markets and growth in existing markets requires expansion of production to meet the rise in demand. Increasing processing capacity means hiring more people. This also attracts more players or enterprises into industry in the process creating more employment.</p>
Processing	<p>The intermediate processing as part of the integrated system creates flexibility in production capacity.</p> <p>Intermediate products inventory will serve as buffer for sharp rise in demand as well as a means of smoothening supply.</p> <p>Adoption of productivity enhancing technologies as well as quality enhancing technologies both in intermediate and central processing plants standardize products as well as improve processing efficiency.</p>	<p>Intermediate processing becoming part of the system subjects it to good working environment rules and regulations demanded by processing certifications such as HACCP, global GAP, GMP, traceability, and others.</p> <p>This also covers the consolidation and central processing plant which monitors the conformance to these rules and regulations by other players in the VC.</p> <p>Adherence to Child Labor free certification as required by importing countries particularly in the EU and US.</p>	<p>Network of intermediate processing plants creates more employment at the farm level where the processes are done.</p> <p>Farm level processing as well as raw material processing into finished products such as coco-coir nets, logs, compressed peats, and others increase more employment at the rural areas.</p> <p>Linkage with other processors also promotes more employment as the VCO/coco sugar processing enterprise consolidates supply to meet large order beyond its plant capacity.</p>
Production of raw materials	<p>The nucleus farm which a leased backward integrated operation of the processing enterprise ensures supply, quality and competitively priced raw materials.</p> <p>Outsourced farms which are also certified provides flexibility in raw materials procurement through a pool of suppliers that serves as supply buffer.</p>	<p>As part of an integrated operation the production of raw materials requires also global GAP certification and sustainability certifications. The former as noted earlier demands good working conditions in production besides conforming to environmental protection rules and regulations.</p> <p>Adherence to Child Labor free certification as required by importing countries particularly in the EU and US.</p>	<p>The nucleus farm which is an integration of leased farms provide additional employment by hiring farmers-landowners as workers in the farm.</p> <p>Stricter production requirements also generates more employment in the nucleus as well as outsourced farms to ensure conformity to food safety, traceability and environmental sustainability protocols.</p>

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