



THE NATIONAL HIGH VALUE COCO PRODUCTS
(VCO, COCO SUGAR AND COCO COIR)
INDUSTRY ROADMAP
2022-2030

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A road towards a resilient, secure, sustainable and globally competitive coconut industry with empowered and prosperous farmers and entrepreneurs.

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EXECUTIVE SUMMARY

The HVCP, short for the High-Value Coconut Products (Coco Coir, VCO, and Coco Sugar) Industry Roadmap 2022 - 2030, elevates and aligns itself to the second phase (2018 to 2021) two-fold thrust of the Philippine Manufacturing Industry and Manufacturing Resurgence Program (MIR-MRP) Roadmap, which is to – 1) shift to high value-added activity and investments in upstream industries, and 2) link and integrate MSMEs with large enterprises thereby setting a chain reaction of broad-based industrial development while strengthening further its competitiveness as an emerging industry. This MIR-MRP Strategy link of the HVCP Roadmap 22-30 effectively aligns itself to the current administration’s Philippine Development Plan and the Philippine commitments to Sustainable Development Goals (SDG), and more specifically, this roadmap coheres with the Coconut Farmers and Industry Road Map (Coco FIRM) 2021 - 2040. Together, these documents form part of the basis for the enactment and implementation of RA 11524 or the Coconut Farmers and Industry Trust Fund Act of 2020.

Anchored on the unified VISION of the coconut industry that is to have a *“resilient, secure, sustainable, and globally competitive coconut industry with empowered and prosperous farmers,”* the industry intends to *develop agro-industrial business corridors (ABCs) with synergistic and inclusive integration of all stakeholders.* With the three promising HVCP product formats energized by the enactment of the RA 11524 of 2021, the entire industry is strategically positioned for local and global markets. Hence, it is timely that the HVCP industry sector tracks its course of priorities to take advantage of the emerging development opportunities around its market and policy environment.

The virtual consultation forum held last December 9-13, 2021, participated by various value chain (VC) players and stakeholders of the industry, generated about five crosscutting goal statements expressing the industry priorities from each product format (Coir, VCO, and Coco sugar) groupings. The scope ranges from VC integration and development, processing technology enhancement, organizational/institutional strengthening & capacity building, and the need to

pursue expansive diversification and opening new domestic and international markets. The central target for each product format is the urgency of establishing, standardizing, and harmonizing competitive quality definition, which is the case of concern for both Coco Coir and VCO. High in the priorities and targets also for coco sugar is the need to position the product in the market as a *natural sweetener* and not just an ordinary sugar. The necessity of re-engineering its market position as a natural sweetener is to deflect itself from a head-on market collision course with traditional sugar. Gearing from the initial market acceptance, cost competition with traditional sugar might just erode its significant traction of success as an industry.

The virtual forum also generated and/or validated the strategic goals of each HVCP industry product format and derived the various industry targets, which were then connected to as many objectives as were required to ensure that each one supports the achievement of the strategic goals. Next, appropriate plans, activities, and projects (PAPs) were drawn as strategic action steps to attain the industry goals. The numbers and scope of the PAPs largely depend on the nature of the objectives under consideration. In addition, clustering these objectives under a given goal serves as a basis for prioritizing what is actionable from the vantage point of time and available resources. Then finally, everything converges in identifying and crafting the strategic action steps of the PAPs across HVCP product formats, which then provides the conceptual and structural basis for generating the HVCP Industry Roadmap.

Gleaning from the coco coir industry Roadmap (2022-2030), it starts with the essentiality of establishing and harmonizing product-market quality standards and massive and industry-wide capacity building and promotion by 2022 - 2024. Onwards, there is a need to support the momentum with market expansion and diversification. To institutionalize a more sustainable value chain governance for coco coir processors, there is also a need to create and/or organize the Coco Coir Industry Council in different geographic locations and federate to become a national council. These councils will catalyze growth across locations and help localize industry policies reflective of the specific context in every Region. Then finally, the roadmap aims to have expanded to other high-value markets and to establish and operate a husked-based fibreboard processing plant by 2030.

In the case of Virgin CNO, the industry aims to “*become a global producer of high quality, competitive, therapeutic, and sustainable VCO compliant with acceptable global standards*” by 2030. Actualizing this industry vision would involve massive capacity building and market expansion resulting in gradual albeit consistent scaling up of processing capacity from micro to medium in 2030. By 2023, the Visayas region targets micro-scale process VCO using 400kg-nuts per day and the integrated wet process by cream/heating. By 2024, Luzon and Mindanao cluster regions would have started processing VCO using 400kg-nuts per day and using the integrated wet process by cream/heating among microprocessors. Following the targets for 2025 and 2026, micro processing of VCO would have commenced using 400kg-nuts/day, using the integrated wet process by freezing across the three islands (Luzon, Visayas, and Mindanao) producer/processing clusters. The target for 2028 and 2029 would focus on the medium-scale process of utilizing 10,000 kg-nuts per day using the integrated wet process by fermentation across the three island clusters. Then the 2030 target is to scale up the VCO processing to medium-scale processors in Luzon and Mindanao cluster regions using 600 kg-nut per day using the integrated dry process thru a DCN route.

Finally, the coco sugar roadmap envisions “*establishing a sustainable coco sweetener industry with empowered coconut farmers, processors traders, and other stakeholders and position to be the top natural sweetener brand in the market by 2030.*” The immediate target for 2022 to 2024 across all clusters is to (1) strengthen the production and processing sector, (2) sustain capacity development programs (both social and technical skills), and (3) program for market research and development, commercialization, and growth, in line with the desired future for the coco sugar industry. Boosting productive capacity through a large-scale planting of hybrid and dwarf coconut cultivars for sap production will be targeted by 2025. In addition, village-level coconut processing should be established to boost output. The construction of coconut-based agricultural enterprises, trade posts, and coco hubs will be a vehicle for intensive skills and capacity building. Aggressive marketing support will be a priority in Mindanao from 2022-to 2025 since most of the exporters of coco sugar products are from there. From 2025 to 2030, quality certifications, e.g., Halal, Organic, Fair-Trade Cert., and others, shall have been

complied with, and FMRs are completed across key production areas in the three island clusters.

Finally, the first-ever virtual consultation to craft the HVCP Roadmap 2022-2030 was instrumental in articulating and documenting the goals and aspirations of the industry's various value chain players and stakeholders. In addition, it laid down some specific, actionable steps that will guide the development trajectory of the HVCP industry in the next ten years. Moreover, this document reflects and advances the significant national strategic recommendations that the KI participants have adopted and agreed upon as the industry's primary agenda for action in this 2022 PH Coconut Industry Roadmap 22-30. The preceding are some of the abridged versions of the key recommendations across HVCP product formats that will generally describe the directions of the industry in the next ten years.

1 INTRODUCTION

Coconut palms dominate the agricultural landscape of 69 out of the 82 provinces of the Philippines, covering 3.65 million hectares, around a quarter of the country's total arable land. Coconut contributes 25% to the country's agricultural exports, with an average of PHP 91.4 B yearly export earnings from 2014–to 2018 (PSA, 2018). There are over 2.5 million coconut farmers, most of whom are landless tenants and workers (51%), and 49% are owners. Income from coconut farming is low, and over 90% of coconut farmers live below the poverty threshold of PHP 125,775/year (PSA, Ref No.: 2019-053). Most coconut farmers in the 2018 National Coconut Farmers' Registry System (NCFRS) are food insecure and without social protection. Coconut farms are fragmented and small; 75% are 2.0 ha and below; farms in uplands are accessibility constrained with accessibility to roads and markets.

The production sector, the lifeblood of the industry and supplying the feedstock for the various coconut value chains, is beset with problems arising from decades of neglect and abuse. These problems include low priority and budget allocation for the industry, a low and unstable income for marginalized farmers, and an inability to participate in/benefit from traditional and non-traditional coconut value chains. The coconut population in the country is 98% native calls with an average of 10% senility. Around 1.78 million ha, or 50% of coconut areas, are nutrient deficient. The typical coconut farm is poorly managed, “organic by default,” i.e., rainfed, unfertilized, with no regular pest and disease monitoring and control. At the same time, improved tall and hybrid varieties and production technologies for increased productivity are available. Thus, while some 15 billion nuts are harvested annually from 345 M bearing palms, tree productivity in 2019 was only 44 nuts per tree per year, which is much lower compared with the potential of 80–150 nuts per tree per year. The Philippines has the largest coconut area and is the second top producer in the world. Still, the country's productivity per hectare remains the lowest among the top ten coconut producers in the world.

The wide spaces between coconuts and their unique canopy architecture make them suitable for intercropping, yet over 80% of the coconut farms are

monocropped. Coconut areas can increase the country's agricultural output without opening new lands. Intercropping and livestock integration under coconut has been proven to increase farm productivity and income manifold and is an excellent strategy to increase farmers' income and welfare significantly. However, smallholder coconut farmers lack capital and infrastructure and have no sustained access to formal credit sources. Coconut farmers' organizations that should undertake collective action and policy advocacy activities, to voice their socio-economic and other concerns are the exception rather than the norm. The lack of entrepreneurial and leadership skills of farmers' organizations/cooperatives that will enable the association to successfully engage in business enterprises needs to be addressed. There are agribusiness models that coconut cooperatives can adopt (clustering and cooperative management, processing, and marketing that adheres to market standards on reliability and quality) that can mainstream farmers' participation in agro-industrial development corridors. These models include clustering, cooperative management, processing, and marketing to enable products to adhere to market standards of supply reliability and quality.

The key to sustainable growth is an assurance of a steady supply of good quality coconuts, the lifeblood of the various coconut-based value chain industry clusters. However, supply reliability limits the utilization of full crushing capacities of oil mills. About 80% of the coconuts produced in the country are processed into copra, the feedstock for coco oil mills. However, from 2009 to 2019, the estimated yearly utilization of the oil mills ranged only from 38-69% of the total crushing capacity of 3.4 M MT/year of 60 oil mills. In addition, there is an increasing demand for other coconut products from whole nuts and sap, and the magnitude of the supply deficit increases further.

Addressing the strict quality requirement for aflatoxin and PAH levels by the coconut oil and copra cake export markets is critical for the industry's sustained growth. The traditional copra processing practiced by farmers using smoke kilns produces undercooked copra at 15–20% moisture content contaminated with aflatoxin with high PAH. Multi-layered marketing that could take one to three months from small upland farmers to millers results in further physical and quality losses. The Philippines stands to lose the export markets if the country cannot

comply with the stricter standards on allowable limits of aflatoxin and PAH in coconut oil and copra cake. A radical transformation in the copra processing sectors' value chains is an investment that the industry cannot do without.

Twenty percent (20%) of the 15 billion nut production is used for the manufacture of desiccated coconut (DCN), virgin coconut oil (VCO), coconut milk, and other uses, including for home consumption. In 2018, 22 DCN processing plants had a combined capacity of 841 MT. The DCN factories are models for large-scale integrated coconut processing by recovering and processing coconut water into exportable concentrates. By crushing DCN, virgin coconut oil (VCO) is produced at volumes attractive to global players. The by-product of this processing operation is coconut flour. However, the market for coconut water has grown to the point where the coconut water from DCN factories is insufficient to meet the present demands.

The impact of climate change has caused great devastation to many regions, including major production grids. It is expected to remain a concern given the country's geographic location. The Philippines is ranked 4th in the long-term climate risk index in 2021, with the highest number of extreme weather events (2009–2019) among the top ten countries. Buffering the farmers and the industry from the severe impacts of climate-related risks and hazards should be considered in designing programs and interventions.

Despite the backdrop of the struggling coconut industry, subjected to decades of neglect and abuse, characterized by low farm productivity, aging trees, aging and food-insecure farmers with no social protection, stiff competition from palm oil, and inefficient value chains—there are still many very encouraging developments. Among these are a growing recognition of the medical, therapeutic, and nutritional values of coconut products, particularly coconut water, VCO and coconut flour, and coconut cooking oil; expanding markets for coco coir and coco dust products; increasing demand for activated carbon from coconut shell charcoal; maturing of technology packages for producing white copra and VCO; and international recognition for lambanog. Essential factors that stimulate the worldwide demand for non-traditional coconut products (NTCPs) are the growing need for healthier products, coir products, and greener production processes and

products. The global demand for these NTCPs is expected to grow at a CAGR of 5.86% to 10.04%. There is still low domestic consumption of coconut RBD oil as cooking oil due to the influx of imported low-priced palm oil, canola oil, soybean oil, and corn oil, and low utilization of coconut oil as raw material in oleochemical production. Policy to increase the biodiesel blend from 2–5% and reimplementation of EO 259 to allow local production of coco fatty alcohol for the local detergent industry are expected to increase domestic utilization of coconut oil. The domestic demand for VCO will remain high, especially with the disclosure of the DOST on the potential benefits of VCO on COVID patients and the high possibility of combating African Swine Flu. The same trend is expected for coir due to its wide range of uses. However, the local demand for coco sugar growth may be slow-moving due to the reliance on sugarcane-based sweeteners, which are relatively cheaper. The same is true for coconut water since local consumers prefer drinking water from fresh young nuts rather than packaged ones.

The continuing planting and replanting program, supported by the PCA's seed production and hybridization program, is predicted to increase coconut production, breaching 16 billion nuts by 2025, the country's highest production. In addition, participatory on-farm hybridization using assisted pollination techniques is a farmer-inclusive program that can be replicated and upscaled further to increase our utilization of suitable varieties and hybrids, thus increasing the country's nut production potential.

The approval of RA 11524 creating the Coconut Farmers and Industry Trust Fund will start and sustain the process of transforming the industry. Providing social protection and skills enhancement for farmers' organizations and cooperatives ensures active participation in higher value chains. Moreover, these strategies address the need to transform copra processing into a white copra agro-industry corridor owned and managed by farmers' cooperatives, using hybrids and Open Pollinated Variety (OPVs) with profitable intercrops integrating livestock in their entire farm enterprise systems, thus diversifying value-adding options of coconut agro-enterprises—eventually elevating the welfare and income of farmers while strengthening and enhancing the global competitiveness of the coconut industry.

2 VISION, MISSION, GOALS, AND TARGETS

The unified VISION of the coconut industry is to have *A resilient, secure, sustainable, and globally competitive coconut industry with empowered and prosperous farmers*. Its MISSION is *To develop agro-industrial growth corridors with synergistic and inclusive integration of all stakeholders*.

In terms of the high-value coconut products (HVCP), there are three good coco products with untapped *albeit* promising market potential both in the local and global markets. Furthermore, with the enactment and signing of RA 11524 in 2021, the entire coconut industry is given a boost for much-needed support for all the participants/players and stakeholders along the entire stretch of the coconut industry value chain. Hence, it is timely that the HVCP industry sector tracks its course of priorities to strategically position itself and take advantage of the encouraging development around its market and policy environment.

2.1 Coco Coir

Coir, or coconut fiber, is a natural fiber extracted from the outer husk of coconut and used in products such as floor mats, doormats, brushes, and mattresses. Coir is the fibrous material found between the hard, internal shell and the outer coat of a coconut. This product format is in high demand either spindled twine or tufted locally and globally. For basic coir processing, the significant players are decorticators and baled fiber producers. Secondary coir processing includes the following players: (1) twine and coconut net or coco fascine producers; (2) twine and coconut net producers; (3) stitched mat producers; (4) rubberized mat producers; (5) gifts, decors, and houseware producers (coir pots, door mats, and tufted mats); and (6) coco peat producers (peat blocks, loose form grow bags and input to organic fertilizer). Medium-sized coco coir processors in the country mainly process coconut husks into coco coir and coco peat (Costales, 2019). Most of the coir processing companies pass on the processing of coir fiber into twine, geotextile nets, geo logs, and mats to micro-enterprises or village-level enterprises. Some of these companies, however, have in-plant twine making and weaving.

This section presents the Strategic Programs and Projects (PAPs) for coir identified during a virtual focus group discussion (FGD) to craft the HVCP Industry Roadmap for 2022 to 2030. The development of PAPs follows the following process. From the five coir industry stakeholder functions outlined in the mission statement, five strategic goals have been formed – each describing the aspirations or changes that industry stakeholders have wanted to happen to their industry during this roadmap period. Each of the five strategic goals has been aligned with many of the objectives necessary to ensure that the goals supported by the purposes will be fully achieved the strategic goals supported by the purposes. To ultimately accomplish the plans, the appropriate PAPs were then identified, the number of which varied according to the nature of the goals to which they contributed. from the list of desired future scenarios that the key informant participants expressed during the virtual FGD, the original goal statement of the industry was validated. Table 1 presents the Coir industry stakeholders' five-goal statements matching the participants' expressed desired future. It did not only cohere with the industry goals but also provided an implementation idea of the industry PAPs, which is considered vital in the collective effort to achieve the aspirations and development goals of the country's coir industry stakeholders, as outlined in the roadmap.

Goal 1: Value Chain operators' linkages and cooperation strengthened

Goal 2: Efficient production and processing technology-led competitiveness raised.

Goal 3: Sustained industry growth, driven by expanding the product range.

Goal 4: Increased market share in existing, new, and stable markets.

Goal 5: Enablers' complementary actions towards a common goal and impact improved

Table 1. Validated Goals- Coco Coir Industry expressed as desired future of the participants of the industry players and stakeholders' virtual consultation forum

GOALS (THEME)	DESIRED FUTURE
Goal 1: Value Chain operators' linkages and cooperation strengthened.	<ul style="list-style-type: none"> • Strengthened cooperation between agencies and entities involved in the value chain
Goal 2: Efficient production and processing technology-led competitiveness raised.	<ul style="list-style-type: none"> • Established production system coco-coir • Be competitive as India, Sri-lanka, etc., in terms of machinery and quality of produce • Standardized coir twine/peat quality (ph., EC)
Goal 3: Industry growth, driven by expanding the product range, sustained.	<ul style="list-style-type: none"> • Price revisions (coir geonets, unchanged since 2004) • Established marketing system of coco-coir • An industry with increased utilization of coco peat-based organic fertilizer
Goal 4: Increased market share in existing, new, and stable markets.	<ul style="list-style-type: none"> • All seasonal demand products will have regular demand 10-15 years from now • Globally competitive industry; serving both local and export markets; Philippine coir industry; quality and price competitive; efficient industry
Goal 5: Enablers' complementary actions towards a common goal and impact improve.	<ul style="list-style-type: none"> • Full support in terms of provision of hi-tech machinery/equipment that can produce other kinds of coir products. • Sustainable value-chain and supply of raw materials • An industry with easy access to updated market information for coco farmers to be guided accordingly (export market); Philippine coir industry with stable market/global markets

2.1.1 Coco Coir Industry Targets

Using the same approach in the virtual discussion across the three Island clusters (Luzon Visayas and Mindanao), the key informant participants generated Programs Activities and Projects (PAPs) coherent with the identified goals presented in Table 1. Luzon cluster participants came out with three PAPs focused on efficient production, processing technology, and expanding product range. In the Visayas cluster, participants stressed the importance of establishing market linkages; thus, the virtual forum PAPs focused on product standardization to achieve market expansion. In the Mindanao cluster, on the other hand, key informant participants stressed the need to focus first on developing and/or strengthening local authority in smaller areas, thus, localizing policies that will soon be translated into different action steps. One of the relevant action steps highlighted is having massive information campaigns on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.). According to Mindanao participants, localization of such policies will result in having institutionalized buyers through the help of designated agencies such as DPWH. It will also provide hope to MSMEs to sell coir products due to the fact that it is anchored to the legislative agenda of local officials (Table 2).

Table 2. Validated Coco Coir Industry Strategic Objectives (Consultation forum, 2021)

TARGETS	LUZON	VISAYAS	MINDANAO
Strengthen Value Chain operators' linkages and cooperation			
<ul style="list-style-type: none"> Establish product standards of different coco coir products based on foreign and local market requirements. And capacitate our coco coir manufacturers re: technical requirements (product & equipment) required per buyer 		2022-2024	
<ul style="list-style-type: none"> Strengthening of organizations 			2024-2025
Enhance competitiveness through efficient production and applying advanced processing technology			
<ul style="list-style-type: none"> Establish community-based husk processing plants 	2022-2024		
<ul style="list-style-type: none"> Inventory of existing machinery and equipment provided by different line agencies and the private sector and the assessment on each operationalization (due for repair, repainting, etc.) 			2025-2027
Sustain industry growth, driven by expanding the product range			
<ul style="list-style-type: none"> Focus on other coco coir value-added products; market expansion 		2027-2030	
<ul style="list-style-type: none"> Mobile chipping machines (husk chips for composting) 	2024-2025		
<ul style="list-style-type: none"> Coco coir rubberizing plant (mattresses, furniture) 	2025-2027		
<ul style="list-style-type: none"> Establishment of husk-based fiberboard processing plant 	2027-2030		
Increase market share in existing, new, and stable markets.			
<ul style="list-style-type: none"> Scout for reliable institutional buyers (domestic/export) 		2024-2025	
<ul style="list-style-type: none"> Strengthen established market linkages and mass production of standardized products for local/domestic and international markets. 		2025-2027	
Enhance Enablers' complementary actions towards a common goal and impact			
<ul style="list-style-type: none"> Localization of policies and the creation of coco coir council 			2022-2024
<ul style="list-style-type: none"> Technical assistance in generating feasibility studies and marketing plans 			2027-2030

2.2 Virgin coconut oil (VCO)

Coconut oil, in general, is an edible oil derived from the wick, meat, and milk of coconut palm fruit. Coconut oil is a white solid fat, melting at warmer room temperatures of around 25 °C; in warmer climates, it is a clear thin liquid oil during the summer months. Unrefined varieties have a distinct coconut aroma. On the other hand, Virgin coconut oil (VCO) is an oil extracted from coconut meat obtained from fresh coconuts. It may be done using natural methods like dry processing, fermentation, churning (centrifugal separation), cold compression, and wet milling; no bleaching or deodorizing takes place to the name virgin coco oil for additional accent in the market.

VCO processors operating in the Philippines are categorized into: (1) village or micro-scale level intermediaries; (2) SME VCO processors; (3) cooperative/ association VCO processors; and (4) integrated DCN-VCO processing companies. Village-level intermediaries produce and sell raw fermented VCO to some small- and medium-scale VCO processors who improve and standardize product quality using centrifuge technology to meet the high-quality standards of the export market (Costales, 2019). The small- to medium-scale enterprises that export their VCO products practice backward linking to have an assured supply of raw VCO from village-level or micro-scale VCO processors to comply with the volume requirements of foreign buyers.

The VCO products of the small- to medium-scale VCO processor-exporters are certified organic and operate their processing plants with food safety and traceability certifications. For VCO produced by a cooperative or association, its members participate in processing the product as a group. Currently, two of the six cooperative or association-VCO processors operating in the country export VCO abroad. The integrated DCN-VCO processing companies have larger capacities for mass production of good quality VCO using the wet-dry method. These companies have product certifications such as organic, non-GMO, and fair-trade. All the types of VCO processors also cater to the domestic market.

Using the same approach, the VCO goals were derived from the expressed desired future by the different industry players and stakeholders during the virtual focus group discussion from the three island groups: Luzon, Visayas, and

Mindanao. Shown below are the validated goals for the VCO Industry expressed as desired future by the participants during the industry players and stakeholders' virtual consultation forum. Several points were raised as desired future of the players and stakeholders during the virtual forum, which fell on any of the three thematic goal statements.

Goal 1. Efficiency and execution of government support services and programs improved.

Goal 2. Competitiveness of the MSME VCO processing, advanced.

Goal 3. Global market quality standards of VCO are sustained and harmonized.

2.2.1 VCO industry targets

Table 3 presents the validated targets for VCO, which formed part of the PAPs identified in the roadmap. These validated PAPs eventually provided the basis for deriving the final industry roadmap during the virtual FGD of the three Island clusters. There are two common processes to produce VCO: wet and dry processes. The wet integrated process offers novel features such as minimizing time, cost, energy, and manpower. Likewise, the characteristics of VCO in this process are colorless, retaining fresh coconut aroma and sweet coconut taste with the highest content of lauric acid at 49.85%.

By 2022, the industry aims to process VCO using 1,200 kg-nuts per day utilizing the integrated wet process by fermentation among micro-scale processors (Table 3). By 2023, the Visayas region targets micro-scale process VCO using 400kg-nuts per day and the integrated wet process by cream/heating. Then by 2024, Luzon and Mindanao clusters would have started processing VCO using 400kg-nuts per day and using the integrated wet process by cream/heating among microprocessors. Following the targets for 2025 and 2026, micro processing of VCO would have commenced using 400kg-nuts/day, using the integrated wet process by freezing. Across all Island clusters (Visayas, Luzon, and Mindanao), the target for 2028 and 2029 will focus on the medium-scale process of utilizing 10,000 kg-nuts per day using the integrated wet process by fermentation for the Visayas, Luzon, Mindanao regions.

By 2028, Visayas would have achieved VCO processing by the medium-scale processors using 600 kg-nut per day, using the integrated dry process by Desiccated Coconut (DCN) route. The target for 2030 is to process VCO by the medium-scale processors in Luzon and Mindanao cluster regions using 600 kg-nut per day, using the integrated dry process by DCN route.

Table 3. Validated VCO industry strategic objectives (2021)

TIMETABLE	INDUSTRY TARGETS		
	LUZON	VISAYAS	MINDANAO
2022	MICRO-SCALE Integrated wet process, fermentation, 1200kg-nuts/day	MICRO-SCALE Integrated wet process, fermentation, 1200kg-nuts/day	MICRO-SCALE Integrated wet process, fermentation, 1200kg-nuts/day
2023		MICRO-SCALE Integrated wet process, cream/heating, 400kg-nuts/day	
2024	MICRO-SCALE Integrated wet process, cream/heating, 400kg-nuts/day		MICRO-SCALE Integrated wet process, cream/heating, 400kg-nuts/day
2025		MICRO-SCALE Integrated wet process, freezing, 400kg-nuts/day	
2026	MICRO-SCALE Integrated wet process, freezing, 400kg-nuts/day		MICRO-SCALE Integrated wet process, freezing, 400kg-nuts/day
2027		MEDIUM-SCALE Integrated wet process, fermentation, 10,000kg-nuts/day	
2028	MEDIUM-SCALE Integrated wet process, fermentation, 10,000kg-nuts/day	MEDIUM-SCALE Integrated dry process via DCN 600 kg-nut/day	MEDIUM-SCALE Integrated wet process, fermentation, 10,000kg-nuts/day
2029			
2030	MEDIUM-SCALE Integrated dry process via DCN 600 kg-nut/day		MEDIUM-SCALE Integrated dry process via DCN 600 kg-nut/day

2.3 Coco Sugar

Coconut sugar is the crystallized nectar of the coconut palm tree blossom, made by boiling the flower's sap until it thickens and solidifies. It is mainly composed of sucrose (around 70%) followed by glucose and fructose. It has been used as a natural sweetener in South-East Asia for centuries, particularly in the Philippines and Indonesia, and is also known as coco sugar, coconut palm sugar, or coco sap sugar. This kind of sugar has a low glycemic index, beneficial to people having problems with traditional dietary sweeteners.

Only a small percentage of the Philippine coconut sugar production is sold on the international market, according to the Department of Trade and Industry data for 2020-2021. Most of the product supply is distributed locally, with 78 percent sold to local market outlets within the region and 20% sold to national markets. Only 2% of the product is sold to the international market, such as Thailand, Singapore, China, the United States, the United Kingdom, London, Israel, the Netherlands, Belgium, Germany, London, and Japan. Retailers serve as distributors in the local market (Manohar, 2021). Local brands of coconut sap sugar are available in supermarkets, but their retail price is higher than that of muscovado sugar. In addition, some retailers buy unbranded coconut sap sugar and provide their branding and labels. The coco sugar industry is still in its infancy stage of the product life cycle. Due to its untapped potential both in the local and the global market, it is positioned as one of the most promising HVCP lines with an ambitious industry vision. *"Becoming a sustainable coco sweetener industry with empowered coconut farmers, processors, traders, and other stakeholders and positioning ourselves as the world's top natural coconut sweetener brand."*

As such, the key informant stakeholders (KIS) wanted to make the following happen at the regional level.

Mindanao: "To make Mindanao the world's largest producer of high-quality coco sweetener in the domestic and global markets by 2025."

Luzon: "To establish the Philippine coconut sap sweetener as a leading natural sweetener brand worldwide."

Visayas: "A globally sustainable coco sugar industry in the Visayas Region empowered the coconut farmers and stakeholders."

Goals: Identifying the development goals of the coco sugar industry is essential to determining priorities and targets for sustainable enterprise. Taking from the responses of the FGD participants from the Luzon, Visayas, and Mindanao clusters, we were able to describe their “desired future” for the coco sugar industry 10 to 15 years from now. Identifying the desired future is the first step in recognizing their short-term or long-term goals. Five goals were determined from the list of desired future responses (Table 4).

Goal 1. Strengthened and empowered the network and cooperation of the coco sugar value chain operators.

Goal 2. Enhanced competitiveness based on efficient and sustained production, manufacturing, and processing technology.

Goal 3. Continued industry growth, aided by product diversification.

Goal 4. Increased market share in existing, new, and stable markets.

Goal 5. Improved impact and complementarity of enablers' acts toward a single goal

Table 4. Validated Goals for Coco Sugar Industry as desired future of the participants during the industry players and stakeholders' virtual consultation forum

GOALS (THEME)	DESIRED FUTURE
<p>Goal 1: Strengthened and empowered the network and cooperation of the coco sugar value chain operators.</p>	<ul style="list-style-type: none"> • High participation of young generations in production and processing activities. • Establish coco sugar industry association • Organization of farmers' cooperatives to collect sap, initial processing, promotion, marketing, etc. • Availability of profile for coco sap for coco sugar processing
<p>Goal 2: Enhanced competitiveness based on efficient and sustained production, manufacturing, and processing technology.</p>	<ul style="list-style-type: none"> • High production of planting materials (dwarf variety). • Increased production of sap for processing production of coco sweetener • Has a sustainable and progressive production, specifically benefitting the farmers and coco sweetener producers • Identified recommended varieties for coco sugar production, specifically using dwarf varieties. • Increase coco sap production for sugar processing. • Mechanized coco sap collection method and coco sugar processing.
<p>Goal 3: Continued industry growth, aided by product diversification.</p>	<ul style="list-style-type: none"> • It will be used as a regular staple as a sugar substitute. • It will be repositioned as a premium “healthy” sweetener. • To be ranked as the #1 brand of coco sweetener internationally. • Acceptability of coco sugar for Filipino consumption. • Development of specialized products out of coco sugar, including allied- by-products for a market niche. • Shifting of coco sugar as a commodity rather than a luxury product.
<p>Goal 4: Increased market share in existing, new, and stable markets.</p>	<ul style="list-style-type: none"> • Increased domestic utilization- as a go-to sweetener” of the mass consumer. • Availability of coco sweetener in traditional and modern retail markets in the country. • Establish a commodity-specific (coco-sweetener) marketing in charge or marketing agency per cluster. • Coco sugar can penetrate local and foreign markets with a stable marketing network.
<p>Goal 5: Improved impact and complementarity of enablers' acts toward a single goal.</p>	<ul style="list-style-type: none"> • Intensified government support to the coco sugar industry. • A comprehensive study on the glycerin index and other health benefits for coco sugar, specific for the Philippine coconut industry.

2.3.1 Coco Sugar Industry Targets

FGD participants in the virtual forum for coco sugar also validated the identified PAPs to develop the coco sugar industry from 2022-to 2030. After several discussions, an agreement has arrived at the five-goal statements outlined in the previous section. In addition, two PAPs were put across as initially identified in the COCO FIRM document. Among them are retooling or re-distilling the factory for the "lambanog" set-up in Quezon and retooling coco sugar and syrup production facilities in key strategic locations. While this is still applicable for the Luzon cluster, some targets were also asserted, resulting in the completion of Table 5 below.

Moreover, as shown, the strategic objective provides projected targets for 2022 to 2030 in terms of strengthening the production and processing sectors; sustained capacity development programs (both social and technical skills); programs for market research and development, commercialization, and growth; financial aid and credit programs for production, processing, and trading; and infrastructure and development programs.

The targets for 2022 and 2030 are to improve the coco sugar production and processing industries. For sap production, a massive planting of hybrid and dwarf coconut species is planned, as well as the establishment of coconut processing centers at the village level, the processing of sap-based products with value-addition, the provision of shared service facilities, and product innovations such as better packaging, labeling, and barcoding. Moreover, supporting coco sweetener manufacturers/producers with immediate financial assistance or a program.

Training initiatives and other capacity-building activities for coco sugar growers, sap collectors, cooperatives, businesses, and other stakeholders are part of the long-term capacity-building projects. In addition, a point organization (with a single point of contact) for the marketing industry in Mindanao was identified.

Extensive marketing and promotional initiatives (e.g., exhibits, links with trade attachés in other countries) targeted market research, development, commercialization, and expansion. There is also the participation of small and medium-sized businesses (SMEs) in international trade shows and exhibits, as well

as clinical studies on the health benefits of coco sweeteners, obtaining global market certifications and accreditations for products like coco sweeteners (such as halal, organic certifications, fair-trade certifications, and so on), and market penetration. At the same time, farm to Market Roads (FMRs) will be rehabilitated and concreted between 2025 and 2030.

Table 5. Validated Coco sugar industry strategic objectives (Consultation forum, 2021)

TARGETS	LUZON	VISAYAS	MINDANAO
Strengthen the production and processing sector:			
<ul style="list-style-type: none"> Massive planting of hybrid and dwarf coconut varieties for sap production. 	2022- 2023		
<ul style="list-style-type: none"> Establishment of village-level coconut processing centers and provision of sap-based product processing facilities and shared service facilities 	2022- 2023		
<ul style="list-style-type: none"> Review and enhance coco sweetener quality standards to meet domestic and global requirements. 			2022- 2023
<ul style="list-style-type: none"> Consolidations of coco sweetener products for efficient logistics distribution. 			2022- 2023
<ul style="list-style-type: none"> Establishment of trading posts, coco hubs, and coconut-based agribusiness enterprises. 	2024		
<ul style="list-style-type: none"> Product development and diversification of coco-sugar-based value-added products. 	2024		
<ul style="list-style-type: none"> Develop product innovations through improved packaging, labeling, and barcoding. 	2024		
<ul style="list-style-type: none"> Intensify advocacy on producing coco sugar using e-platforms. 	2024		
<ul style="list-style-type: none"> Assessment and benchmarking of successful technologies (e.g., efficient cooking technology) using renewable energy for cost efficiency and effectiveness. 		2022- 2023	2024
Sustained capacity development programs (both social and technical skills)			
<ul style="list-style-type: none"> Training of coconut farmers and sap collectors, sugar producers, entrepreneurs, farmer organization cooperatives, and other stakeholders. 	2022- 2023	2022- 2023	
<ul style="list-style-type: none"> Capacity building on market negotiation and participation of SMEs in international trade fairs and exhibits 		2022- 2023	

TARGETS	LUZON	VISAYAS	MINDANAO
<ul style="list-style-type: none"> Creation of point organization (with a focal person) for the marketing sector for the entire Mindanao. 			2022- 2023
Program for market research & development, commercialization, and growth			
<ul style="list-style-type: none"> Extensive marketing and promotional activities (e.g., exhibitions, linkages with trade attachés in various countries (at least two meetings per year) 	2022- 2023		2024
<ul style="list-style-type: none"> Participation of SMEs in international trade fairs and exhibits 	2024		
<ul style="list-style-type: none"> Conduct clinical studies on the health benefits of coco sweeteners. 			2024
<ul style="list-style-type: none"> Securing certifications, compliances, and accreditations to compete in the global market, e.g., Halal, Organic, Fair-Trade Cert., etc. 		2025- 2030	
<ul style="list-style-type: none"> Penetration of global markets. 		2025- 2028	
Financial aid and credit programs for production, processing, and trading			
<ul style="list-style-type: none"> Immediate financial aid/ program to support coco sweetener manufacturers/ producers. 			2022- 2023
Infrastructure and development program			
<ul style="list-style-type: none"> Rehabilitation and concreting of Farm to Market Roads (FMRs) 	2028- 2030		2028- 2030

3 STRATEGIC PROGRAMS AND PROJECTS

This section delves into the strategic program activities and projects (PAPs) identified during the 2021 virtual industry stakeholders' consultation forum. Using the same interactive processes, the strategic goals were generated, which form part of deriving the individual product PAPs of the industry. These strategic goals were embodied in the mission statement of the industry. Each of the strategic goals connects to as many objectives as were required to ensure that the strategic goals that the objectives support are fully exploited. Finally, appropriate PAPs were selected to accomplish the objectives, the number of which varied depending on the nature of the objectives.

3.1 Coco Coir Programs and Projects

In terms of the coco coir industry, the programs and projects of the PAPs were generated based on stakeholders expressed desired future during the virtual focus group discussion. Five goals were established from the desired vision. Objectives were developed to ensure that the strategic goals that the objectives support are fully realized (Table 6a - Table 6e). Finally, suitable PAPs were selected, the number of which varied depending on the nature of the objectives they contributed.

Table 6. Validated programs and projects for coco coir industry highlighted during the players and stakeholders' virtual industry consultation (2021)

Goal 1	Linkages and Cooperation among Value Chain operators strengthened	
Objective 1.1	Creation of PH coco coir council and its development as coco coir industry community of practice	
Programs and Projects		
1.1.1 Establish regional and national coir industry council to represent the industry in negotiations and development planning	1.1.2. Orient farmers' organizations on RA 10048, RA 11524, and other government programs and policies	
Objective 1.2	Capacity Development	
Programs and Projects		
1.2.1. capacity building on market negotiation, and participation of SMEs in international trade fairs and exhibits		
Goal 2	Industry competitiveness promoted through improved/technology-Enhanced production and processing practices/processes	
Objective 2.1	Production and processing capacities leveled up through appropriate equipment acquisitions or upgrades	
ProgPrograms and Projects		
2.1.1. Establish community-based integrated coconut husk processing and coco-peat-based bio-organic fertilizer production as a local consolidator and BIG BROTHER of the small coir processing in the area.	2.1.2. Establish husk consolidation centers (clustering) at the barangay and municipal levels	2.1.3. Research to improve processing efficiency
2.1.4. Establish professionally managed husk consolidation/processing centers (clustering) at the barangay and municipal levels	2.1.5. Conduct massive information campaigns on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.)	

Table 6. Continuation..

Goal 3	Industry growth achieved by high solid value product development initiatives	
Objective 3.1	Pricing of coco coir products	
Programs and Projects		
3.1.1. Develop programs and strategies to improve the price competitiveness of the Philippine coir		
Objective 3.2	Advocacy for strategic policies to promote industry and product innovation, adherence to quality standards, and industry-oriented research and development	
Programs and Projects		
3.2.1. Formulation of Industry Standards (e.g., Bioengineering Application Protocols; Creation of Monitoring Teams; Monitoring of Standards Compliance; and Capacity Building for Monitoring Team Members and key industry players	3.2.2. Conduct massive information campaigns on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.)	
Goal 4	New and stable markets accessed and market share performance in existing ones improved	
Objective 4.1	General awareness-raising campaign about the coco coir industry highlighting its triple bottom line development capacity	
Programs and Projects		
4.1.1 Invite youth groups to participate in the Orientation and information drive	4.1.2. Conduct a massive information campaign on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.)	4.1.3. Promotion and advertising on digital and traditional platforms to create interest and increase demand for the coconut industry's economic advantage

Table 6. Continuation...

Objective 4.2	Market intelligence strengthening and intensification of targeted market development initiatives	
Programs and Projects		
4.2.1 Market facilitation, linkage, and matching to increase market access and promotion (domestic and export) within the value chain; should focus on direct trading of farmers' organizations/cooperatives to coconut processing companies and institutional buyers;	4.2.2. Continuous market research by PCA, DTI-BETP on the market trends and uses of new products from coco coir, fiber, products, and peat, as well as on the potential markets for coir	4.2.3. Promotion and advertising on digital and traditional platforms to create interest and increase demand for the coconut industry's economic advantage
Goal 5	Convergence and complementation of government enablers/ support to the coco coir industry strengthened.	
Objective 5.1	Harmonization of government programs and projects for coco coir industry	
Programs and Projects		
5.1.1. Formulation of continuity/sustainability plans	5.1.2. Crafting, issuance and Implementation of a policy promoting continuous industry development through product development and innovation, research and development, and other relevant measures.	5.1.3. Tap COCO LEVY FUND for shared service facilities, financing programs, and other government programs to expand capacities and improve the machinery of coir processing plants
Objective 5.2	Improvement of governance and implementation of government programs and projects for coco coir industry	
Programs and Projects		
5.2.1. Support zero farm waste program and cocopeat-based organic fertilizer production as an enterprise.	5.2.2. Strengthened implementation of the provisions of the existing laws and policies on the use of coir for erosion control and coco peat for soil amelioration/ medium for crop production and hydroponics system	5.2.3. Implement the provision of the agriculture and fisheries modernization act mandating the inclusion of agri-related processes and activities/programs in high school and college curricula
5.2.4. Institutionalization of the Utilization of Coco peat in Fertilization and Food Security Programs		

3.2 VCO Programs and Projects

From the industry goals and targets, the validated information about the VCO industry's programs, activities, and projects (PAPs) were also derived as expressed by the key informant participants. Then following the same approach in the virtual forum, the VCO industry PAPs were generated from the virtual focus group discussion. Table 7 and Table 7e present the derived validated goals and objectives. The strategic objectives were developed to ensure that the strategic goals that the objectives support are fully realized. Finally, suitable PAPs were selected, the number of which varied depending on the nature of the objectives they were contributing to.

Table 7. Validated programs and projects for the VCO industry highlighted during the players and stakeholders' virtual industry consultation (2021)

Goal 1	Efficiency and execution of government support services and programs improved.	
Objective 1.1.	Harmonize government programs and project support to the VCO industry.	
Programs and Projects		
1.1.1. Assessment and Review of the Programs, Activities, and Projects of Stakeholders	1.1.2. Hold consultation activities with VCO value chain players for planning and capacity-building needs	1.1.3 Strengthen training programs for VCO players from key government agencies
Objective 1.2.	Improve the VCO industry's control and execution of government initiatives and projects.	
1.2.1. Hold consultation activities with VCO value chain players		
Goal 2	Competitiveness of MSME VCO processing, advanced	
Objective 2.1.	Capacity Building for MSME VCO value chain operators	

Table 7. Continuation...

Programs and Projects		
2.1.1 Design and implement a Training program aligned to the needs of the VCO MSMEs	2.1.2. Monitor and evaluate the training program	
Objective 2.2.	Production and processing capacities leveled up through appropriate equipment acquisitions or upgrades.	
Programs and Projects		
2.2.1. Procurement of new technologies and provision of facilities	2.2.2. Strengthen research on VCO new technologies	2.2.3. Established integrated processing center to consolidate, further process, and standardize raw VCO using a high-capacity centrifuge process to create economies of scale in production
2.2.4. Accreditation of government and available private laboratories in various locations for VCO quality analysis	2.2.5. Conduct training-workshop on digital marketing (e-commerce)	
Goal 3	Global market quality standards of VCO improved.	
Objective 3.1	Standardized processing of VCO for domestic and export markets	
Programs and Projects		
3.1.1. Stringent implementation and monitoring of the PNS compliance by PCA to protect VCO quality	3.1.2. Strict implementation of FDA licensing and monitoring for VCO plants and MSME VCO processors	3.1.3. Regular and consistent inspection of licensed VCO plants and MSME VCO processors for GMP and HACCP compliance
3.1.4. Strengthen research on VCO technologies, processing, and health concerns, tapping on VCO as a base for other high-end use		

3.3 Coco Sugar Programs and Projects

The strategic programs and projects (PAPs) for the coco sugar industry that were identified during the virtual FGD validation workshop are presented in this section. Table 8a - Table 8c presents the derivation of PAPs from the industry goals and objectives. The following procedure was used to create the PAPs. First, five strategic goals were developed as a resulting theme from their desired future statements. Then, described by the coco sugar industry stakeholders, each represents the wish or change that industry stakeholders want to happen. Finally, the number of PAPs needed to be identified to eventually operationalize the goals, which varied depending on the nature of the goals to which they contributed. The PAPs' faithful execution is crucial in the joint endeavor to satisfy the country's coco sugar sector stakeholders' objectives and development targets as described in this Roadmap.

Table 8. Validated programs and projects for the coco sugar industry highlighted during the players and stakeholders' virtual industry consultation (2021)

Goal 1	Strengthened and empowered the network and cooperation of the coco sugar value chain operators.	
Objective 1.1	Establishment of coco sugar council, as well as activities aimed at harmonizing collective efforts in the coco sugar industry	
Programs and Projects		
1.1.1. Consolidations of coco sweetener products for efficient logistics distribution.	1.1.2. Establishment of trading posts, coco hubs, and coconut-based agribusiness enterprises.	
Goal 2	Enhanced competitiveness based on efficient and sustained production, manufacturing, and processing technology.	
Objective 2.1	Strengthen the production and processing sector	

Table 8. Continuation...

Programs and Projects		
2.1.1. Massive planting of hybrid and dwarf coconut varieties for sap production.	2.1.2. Establishment of village-level coconut processing centers and provision of sap-based product processing facilities and shared service facilities	2.1.3. Review and enhance coco sweetener quality standards to meet domestic and global requirements.
2.1.4. Assessment and benchmarking of successful technologies (e.g., efficient cooking technology) using renewable energy for cost efficiency and effectiveness.	2.1.5. Intensify advocacy on producing coco sugar using e-platforms.	
Objective 2.2	Sustained capacity development programs (both social and technical skills)	
2.2.1. Capacity building on market negotiation and participation of SMEs in international trade fairs and exhibits	2.2.2. Training coconut farmers and sap collectors, sugar producers, entrepreneurs, farmer organization cooperatives, and other stakeholders.	
Objective 2.3	Financial aid and credit programs for production, processing, and trading.	
2.3.1. Immediate financial aid/ program to support coco sweetener manufacturers/ producers.		
Objective 2.4	Infrastructure and development program	
2.4.1. Rehabilitation and concreting of Farm to Market Roads (FMRs)		
Goal 3	Continued industry growth, aided by product diversification.	
Objective 3.1	Strengthen the production and processing sector:	
Programs and Projects		
3.1.1. Product development and diversification of coco-sugar-based value-added products.	3.1.2. Develop product innovations through improved packaging, labeling, and barcoding.	

Table 8. Continuation...

Goal 4	Increased market share in existing, new, and stable markets.	
Objective 4.1	Program for market research & development, commercialization, and growth	
Programs and Projects		
4.1.1. Securing certifications, compliances, and accreditations to compete globally, e.g., Halal, Organic, Fair-Trade Cert., etc.	4.1.2. Penetration of global markets	

4 STATE OF THE HCVP INDUSTRY

4.1 Coco Coir Industry

This chapter presents the current state of the coco coir industry. In addition, the KI participants have validated the following data during the 2021 Coconut Industry Road-mapping Focused Group Discussion. The data and information presented during the virtual forum were Coco Coir Industry SWOT/TOWS Analysis and the validated Coco Coir Value Chain Map.

Coco Coir processing in the Philippines has lately become quite popular. Such unprecedented popularity was won by its unique demonstrated capacity to mitigate two significant challenges facing the nation today – poverty and environmental degradation. In precise terms, the coco coir industry has become a potent government partner in addressing pressing ‘economic’ and ‘environmental’ concerns. ‘Economic,’ because coco coir processing initiatives have now been unleashing the gold mine in what used to be regarded as ‘trash’ by converting husks into ‘cash.’ Such initiatives have become very much like community ‘CHAMPION’ enterprises (CCEs) in mostly rural coconut-producing areas in the country since they have provided livelihood and income opportunities not only to coconut farmers but also to women, mothers, elderly, children, out of school youth (OSY), informal sector, and even prisoners. The Bislig City Jail, for example, has accorded its inmates a livelihood through coco coir processing and, in the process, won the 2011 Bureau of Jail Management and Penology (BJMP) Most Productive Inmates Award for Livelihood). ‘Environmental’ because coco coir processing is now contributing to the greening, protection, and rehabilitation of the environment through the use of bioengineering technology.

For this, the National Convergence for Sustainable Rural Development (NCSRDR), composed of the Department of Agriculture (DA), Department of Agrarian Reform (DAR), Department of Environment and Natural Resources (DENR), and the Department of Interior and Local Government (DILG), is now recognizing coco coir processing as a green and inclusive agro enterprise.

4.1.1 Industry Processing Capacity

As shown in Table 9, most (71%) of the coir processing plants operate in Mindanao. Approximately 32% are in the Caraga region, while about 12% and 16% are in the Northern Mindanao and Davao Region. The remaining 29.1% are scattered in several regions such as MIMAROPA (4.24%), CALABARZON (6.06%), Bicol Region (4.24%), Western Visayas (2.42%), and Eastern Visayas (3.64%).

Table 9. Number of decorticating/coir processing plants by region in the Philippines, 2021

Region	Number of processing plants	Percent Share
II (CAGAYAN)	4	2.4
III (AURORA)	1	0.6
IV-A (CALABARZON)	17	9.1
IV-B (MIMAROPA)	7	4.2
V (Bicol Region)	7	4.2
VI (Western Visayas)	4	2.4
VII (Central Visayas)	14	8.5
VIII (Eastern Visayas)	6	3.6
IX (Zamboanga Peninsula)	5	3.0
X (Northern Mindanao)	20	12.1
XI (Davao Region)	27	16.4
XII (SOCCSKSARGEN)	13	7.9
XIII (Caraga)	51	25
BARMM	1	0.6
Total	177	100.0

Source: PCA and PSA from the Philippine Coconut Farmers and Industry Roadmap (2021-2040)

The country's top coir processing plants are Pilipinas Eco fiber Corporation, Rong Ming Cocofiber Industries Corporation, Tropical Prime Coir Corporation, Jiffy Coir Products of the Philippines Inc., Jin Qi Xiang Ventures Inc., Dondon Marketing, and All Bright Resources International Inc. Costales (2019) reported that coco coir/peat processors in the country are mainly MSMEs. Their processing plants are relatively small in scale or capacity, and the technology level is relatively inferior to processors in India and Sri Lanka. Their primary product is coco coir, with some commercializing coco peat as a by-product. Aside from baled and raw coco coir, some processors integrate into twine, geonets, and biologics, which are essential materials in soil erosion control.

4.1.2 Market

India has been the world's top exporter of coconut coir from 2009–to 2019. It has approximately 80% average market share, followed by Sri Lanka with a 7% market share (Table 10). The Philippines trailed behind with only a 2% share in the global coir market. Although the Philippines ranked third, it exhibited the fastest growth rate at an average of 24% per year among the three leading world coir exporting countries. India's average annual growth rate during the 11 years under review was 19.5% per year, while Sri Lanka showed a negative growth rate (-3.7%/year) in coir export volume. The Philippines exported nontraditional coir products composed of baled coir, other raw fibers, coco peat/dust, coir twine, coco pads/liner, and coco husk cubes.

Table 10. Average annual volume and growth rate of coco coir by three leading country exporters in the world, 2009–2019

Country	Total Export Volume (MT)	Percent Share (%)	Rank	Average Annual Export Volume (MT)	Ave. Annual Growth Rate (%)
India	6,516, 726	80	1	592,430	19.5
Sri Lanka	539,591	7	2	49,054	-3.7
Philippines	185,589	2	3	16,872	24.0
World	8,155,055			741,369	

The country's volume of exports of baled coir decreased from 2,079 MT in 2009 to 544 MT in 2019 but later increased in 2020 to 108,690.37 MT (Table 11). However, the highest shipment of baled coir was registered in 2016 due to the high volume of baled coir imports from China (1,720 MT valued at US\$ 481,171) and Japan (1,590 MT valued at US\$ 2.40 million). As a result, the total export earnings generated from baled coir rose from US\$ 366,380 in 2009 to US\$ 10,397,096 in 2020 despite the significant decrease in export volume in 2019. This could be attributed to the higher export price in 2020 compared with that in 2009.

Table 11. Export volume and value of baled coir, Philippines, 2009–2020

Year	Export Volume (MT)	Export Value (FOB \$US)
2009	2,079	366,380
2019	544	370,182
2020	108,690.37	10,397,096.20

4.1.3 Twin Challenge

PCA asserts that a twin challenge faces the coco coir industry – enhancing its competitiveness and sustaining inclusive growth. This twin challenge gets manifested in the following bottlenecks:

- Husk collection difficulty – This is brought about by a host of factors, including 1) community's cultural practices and low level of awareness on coir potentials; 2) lack of logistics support/linkage (PCA Coco Hub and PRDP include hauling trucks in their support package), and 3) very few local consolidators.
- High power cost – No government incentives yet for 'green products.
 - Coco peat's untapped potential – Factors contributory to this are 1) low public awareness of the coco peat uses and benefits; 2) difficulty in transporting; 3) lack of drying facilities; 4) majority of the government-supported coir processing projects do not include having compacting machines.

- Fragmented efforts of the value chain public and private actors – 1) inappropriate combinations and type of machines provided; 2) many coir processing projects are less than the breakeven capacity of 1 ton per day of fiber; 3) many processors are not linked to the consolidators or relevant markets.
- Non-compliance to standards (product and application protocol) – Manifested in 1) twines too thin; 2) coconuts are loosely or unevenly woven; 3) contractors do not follow bioengineering application protocol strictly; 4) no quality controllers in the processing plants.

4.1.4 Bridging the Gaps

PCA recommends the following actions to address the gaps cited.

- Husk collection – 1) Continue “May Kwarta sa Bonut” awareness campaign; 2) Organize farmers and enable them to serve as local raw materials consolidators; Support cooperatives to acquire hauling trucks through inclusion in the package of support or financing facilitation.
- Coir processing – 1) Provide the right kinds and combination of machinery/equipment, thus making fiber milling processes more efficient, controlled, and consistent; 2) Provide project staff and farmer-participants technical with process skills training, quality control, and organizational development activities.
- Standards and product integration – 1) Enhance cooperation between producers and users to resolve quality, quantity, timeliness, and availability issues; 2) Promote/Use the Clustering Approach; 3) Adopt the Value Chain Development and Management Approach; 4) Integrate coir processors from other regions to supply the needed volume on time, and 5) Promote the “Big Brother-Small Brother Concept.”
- Develop and test concepts for new products - 1) Work with DPWH on the utilization of geonets in road stabilization; 2) Have an MOA with

DENR and BFAR on the adoption of the mangrove growing in biologics for mangrove area rehabilitation; 3) Support the Tufting Project in Leyte and establish more tufting facilities in other regions if deemed necessary, and 4) Establish eco board making facilities.

- Other sustainability and competitiveness enhancing strategies – 1) Create visibility for coir and coco peat as beneficial organic fertilizer/soil conditioner and renewable resources; 2) Establish model farms showcasing the use of coir products; 3) Work with certified “Farm Tourism” areas and showcase the uses and benefits of coir products; 4) Conduct learning expeditions with concerned government officers to make them appreciate successful coco coir projects; 5) Adopt the convergence strategy to harmonize programs and efforts

4.1.5 Coco Coir updated the Value Chain map

This section presents the updated value chain validated and approved by the coco coir stakeholders during the 2022 Coconut Industry Road-mapping Focused Group Discussion (Figure 1). The coco coir value chain map comprises the following segments: specific inputs, coco coir twine production, coco coir twine trading, coco coir twine transformation, and coco coir products trading. Each segment in the value chain is a key player or actor who performs specific activities or functions and interacts with each other to bring the product with higher value to the final market or customers.

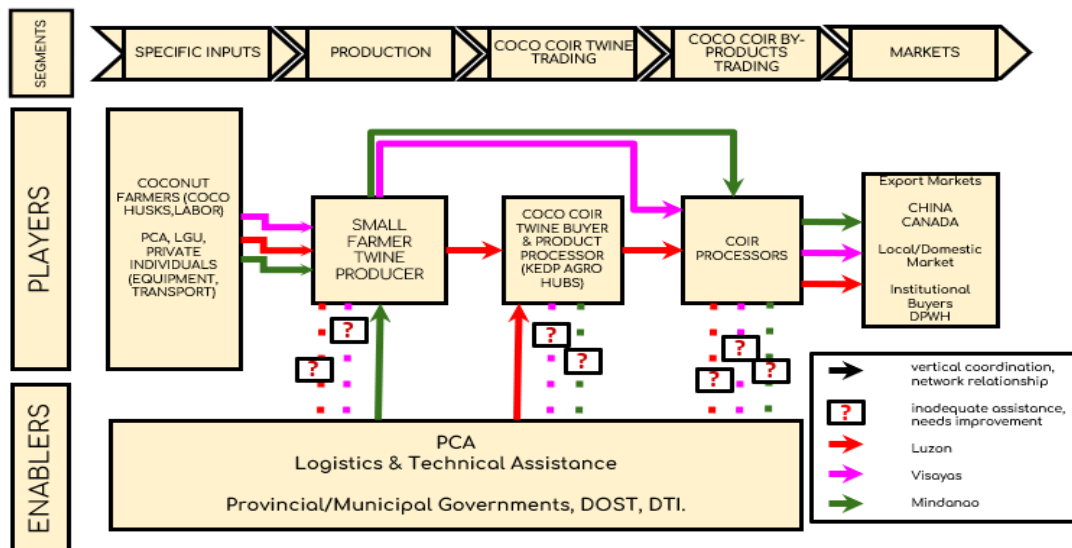


Figure 1. Coco Coir Validated Value Chain Map

Specific Inputs. Providers of inputs constitute the significant players in this segment. The key players include coconut farm owners, suppliers of coconut husks, decorticating and coco coir fiber twining machines, geonet-making equipment, and transport services for coconut husk hauling from the farm to the coco coir processing points. Suppliers of labor, mostly farmer family-owned, form part of the key players in this segment. The focused group discussion results indicate that input providers exhibit vertical coordination with smallholder coconut farmers who are the producers of coco coir twine. This would mean that information and decisions from this segment to the next segment shall be relayed as effective and efficient as possible -which should be coming from the processed coco coir products traders such as the geonet to the coco coir twine producers – on how much inputs of coco coir twine are needed and the standard quality and measurements in coco coir twine production. Inputs such as coconut husks, other materials, and labor were locally accessible, including the necessary equipment to process coco coir twine and geonets. The coconut farmers themselves serve as a source of coconut husks which they process into coir fiber in the production of coco coir twine. PCA provided the decorticating and twining machines to farmers as part of its support program for coconut farmers. Other LGUs, such as Javier, provided its farmer-co-operators a ready-to-process coco coir fiber for twine production.

Production. Smallholder farmers who were members of coco coir twine producing farmer associations constitute the significant players in this segment. They are classified as small coco coir twine producers based on the scale of their operations and level of twine production. Most of the farmer-respondents were just tenants of the farms they operate in, usually one (1) parcel with an average size of 3.8 ha. The cropping of coconut is four times per year, of which coco coir twine production is usually done from April to May. The farmer-respondents have six years of engagement in twine production as sole proprietors and members of the farmers' federated associations. The small farmers' cash operating capital in coir twine production is virtually zero as the coconut husks are freely available using their owned family labor in the collection up to the processing of coir twine. A minimal cash amount is spent for the cost of decortication and transport of their coir twine produced to the buying station or trading center.

Coco Coir Twine Trading. Coco coir twine traders, also called buyer-consolidators, are the key players in this segment. The players involved in this segment are called consolidators. The coco coir twine in hanks produced by small farmers is usually transported to a pick-up point within the vicinity of the market. The hanks were then paid at the trading point where the consolidator is picked up in bulk and brought to storage before delivery to the final buyer-processor of the coco coir twine for processing into geonets and other forms coco coir-based products.

Transformation. The major player, usually with large capitalization, coco coir twine processors, constitutes this segment in the coco coir value chain. This key player of the coco coir processing business is the delivery point of the buyer-consolidator who is engaged in the production of coco coir-based products such as the geonet. According to the interviewed small coconut farmers, the coco coir twine processor produces geonets marketed to various buyers locally in provinces and abroad.

Coco Coir Product Trading. The coco coir product processor-trader is the key player in this coco coir value chain segment. The final depository of the coir twine produced by the small farmers through a consolidator, the processor-traders perform the production of coco coir geonets as the main product and supply the

geonet demands of the final market such as the Department of Public Works and Highways (DPWH), construction firms, and mining companies in particular, in Surigao Province and mostly in other parts of Mindanao.

Final Coco Coir Consumers. Coco coir geonets produced are directly marketed to the final consumers, including the Department of Public Works and Highways (DPWH), private construction firms, and landscaping contractors. The DPWH and private construction firms use geonets to prevent or control soil erosion in sloping hills, particularly during road construction. Even in Mindanao, one of the major buyers of coco coir for geonets is the DPWH in many roads and highway constructions. Although actual volume has not been revealed by Mr. Barbosa, a major trader in Mindanao, DPWH still is the major market for coco coir geonets. (Personal conversation with Mr. Ramon Barbosa, January 2022). In addition, landscaping firms use geonets to stabilize and protect disturbed and open areas in housing subdivisions and roadsides.

4.2 VCO State of the Industry

The purest type of coconut oil, virgin coconut oil (VCO), was introduced to the world market at the end of the 20th century. It is considered one of the great value products derived from fresh coconut. VCO, the clear, high-value oil resulting from the fresh and mature kernel of coconut (*Cocos nucifera L.*), is obtained through mechanical and natural means, with or without the use of heat, without undergoing chemical refining, bleaching, or deodorizing, which does not lead to alteration or transformation of the natural characteristics of the oil. It is now gaining worldwide popularity because of its wide range of applications in medicine, food, cosmetics, etc. Below is the VCO value chain map presented in the focus group discussion conducted for the three island clusters, Luzon, Visayas, and Mindanao (Figure 2). The value chain represents the internal activities a firm engages in when transforming inputs into outputs.

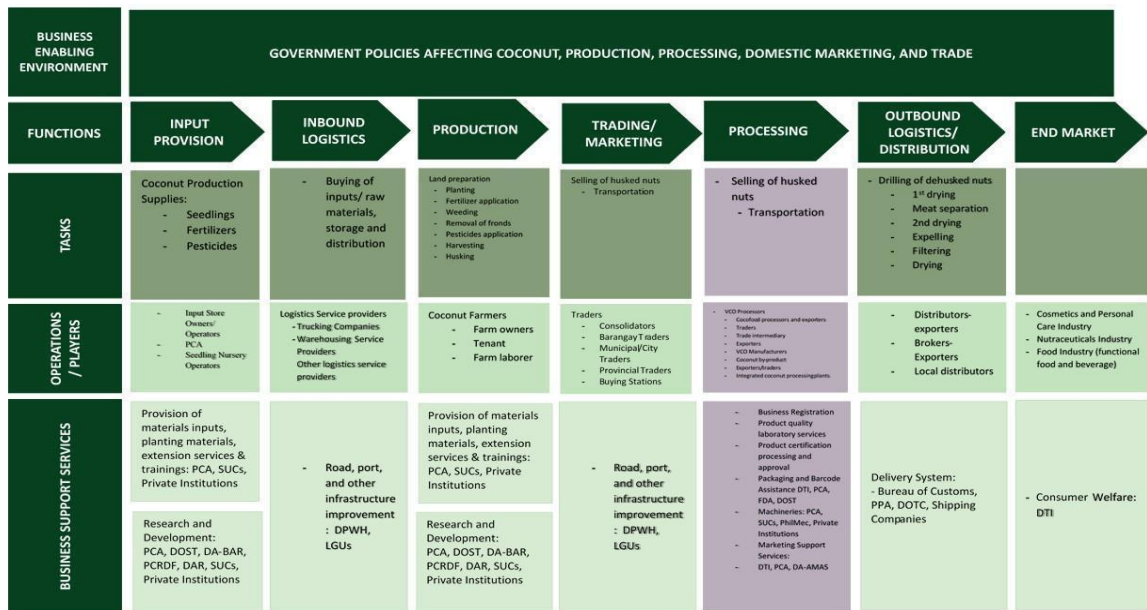


Figure 2. Virgin coconut oil validated value chain map

4.2.1 Industry Processing Capacity

Micro, small, and medium businesses make up the country's VCO processors (MSMEs). They make VCO using a wet process (fermentation and centrifugation) (Costales, 2019). Micro businesses employ the traditional method of extraction, while small and medium businesses with an integrated coconut processing plant use more automated and mechanized lines. Furthermore, micro-VCO businesses often sell to the local market, whereas small to medium-sized businesses are more focused on export. The antibacterial properties of VCO are well-known. VCO's appeal as a natural and green product and its broader applicability in beauty, cosmetics, and personal care products are likely to propel its export market expansion. However, given the encouraging results of the Department of Science and Technology's (DOST) trial on the health benefits of VCO intake to COVID-19 patients, local VCO consumption would stay high. More people would be encouraged to buy VCO as an immune-health supplement for faster recovery, the potential to fight African Swine Flu, and other benefits.

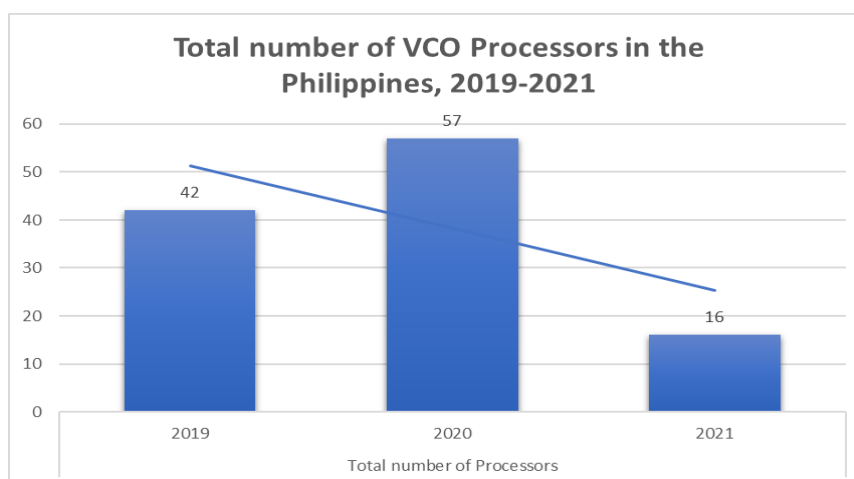


Figure 3. Total number of VCO processors in the Philippines from 2020-to 2021

In 2020, 57 VCO small processors were working in five regions as depicted in figure 3: four processors in Central Luzon, twenty-nine processors in Western Visayas, six processors in Eastern Visayas, and eight processors in the Zamboanga Peninsula, and ten processors in SOCCSKSARGEN. The bulk of the processors (83.33 percent) are in Central Visayas. In 2021 however, only 16 VCO processors were operating in the Philippines, as presented in figure 4; twelve VCO processors in the Sarangani region and 4 VCO processors in Eastern Visayas. Table 2 12 and 13 present a detailed listing of VCO processors across geographic locations in the Philippines for 2020 and 2021, respectively. This decline in the number of processors in 2021 is due to the constraining effect of the COVID19 Pandemic, which disrupted the supply chain both locally and in the export market, resulting in the closure of many plants because of unprecedented losses incurred during the pandemic.

Table 12. Number of VCO processors across geographic locations in the Philippines (2021)

REGION	GEOGRAPHIC LOCATION	PROVINCE	NUMBER OF PROCESSORS
2	Cagayan Valley	Quirino	1
		Isabela	1
3	Central Luzon	Aurora	2
		Zambales	1
		Bataan	2

Table 12. Continuation...

REGION	GEOGRAPHIC LOCATION	PROVINCE	NUMBER OF PROCESSORS
6	Central Visayas	Aklan	5
		Antique	2
		Capiz	2
		Iloilo	12
		Negros Occidental	8
		Cagayan	2
8	Eastern Visayas	Leyte	4
		Samar	3
		Eastern Samar	2
		Southern Leyte	2
9	Zamboanga Peninsula	Zamboanga del Norte	1
		Zamboanga del Sur	2
		Zamboanga Sibugay	5
12	SOCCSKSARGEN	South Cotabato	5
		Cotabato	3
		Sarangani	2
10	Lanao del Norte	Lanao del Norte	1
	Oroqueta City	Oroqueta City	1
	Misamis Oriental	Misamis oriental	3
	Misamis Occ.	Misamis Occ.	2
11	Davao Region	Davao del Sur	1
13	Caraga	Agusan del Norte	7
		Surigao del Norte	5
TOTAL			82

Source: DTI updated list of MSMEs for 2021

1.1.1 Market

The total volume of VCO exports decreased from 18,352MT in 2019 to 15.47MT in 2020. Similarly, the total export earnings generated from VCO also decreased from US\$ 50,665,018 MT in 2019 to US\$ 180,894.10 MT in 2020. The decrease in volume and value was attributed to the disrupting effect of the COVID19 Pandemic. During the FGD conducted for the three island groups, Luzon, Visayas, and Mindanao, the Visayas cluster expressed concern about the Covid19 restrictions that affected their production and the movement of coconuts from farm to the processing site. Another contributing factor wherein the Visayas cluster revealed during the FGD is that logistical costs or transportation expenses for the movement or delivery of products to customers are high. In addition, climate change, natural calamities, and the diseases of coconuts also contributed to this situation.

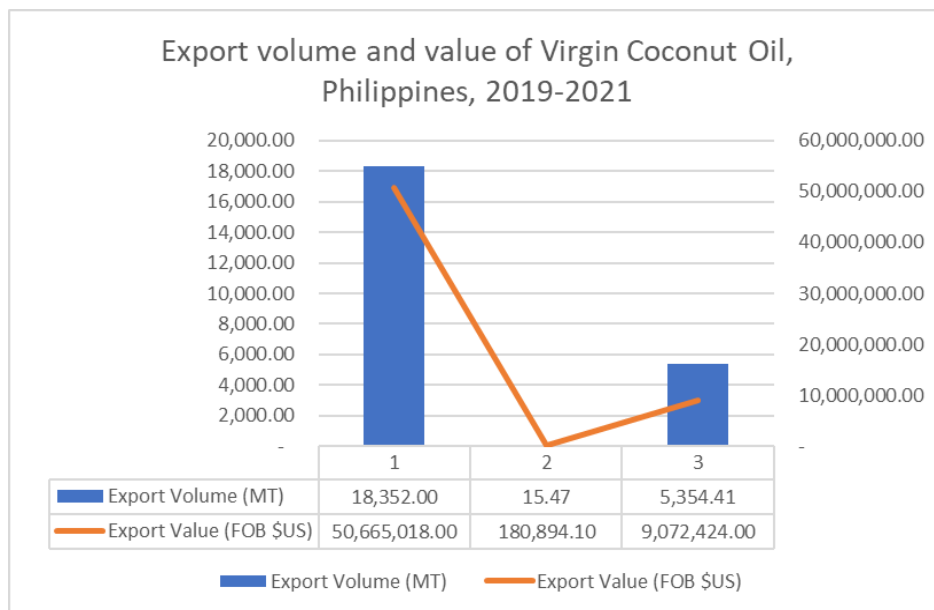


Figure 4. Export volume and value of VCO, 2019-2021

1.2 Coco Sugar State of the Industry

The current state of the coco-sugar industry is discussed in this chapter. During the Focus Group Discussion, the facilitator updated the participants on the coco sugar industry's current strategic value chain situation (Figure 5) presented in the COCOFIRM. The value chain map covers five major components/segments:

input supply, inbound logistics, production, processing, outbound logistics or distribution, and marketing. The COCOFIRM Program mapped out the different actors performing the various processes along the value chain. The program also identifies the task performed at each value chain segment and its business support services. This chapter also presents the highlights of the coco sugar industry indicated in the COCOFIRM's SWOT/TOWS analysis of the coco sugar industry

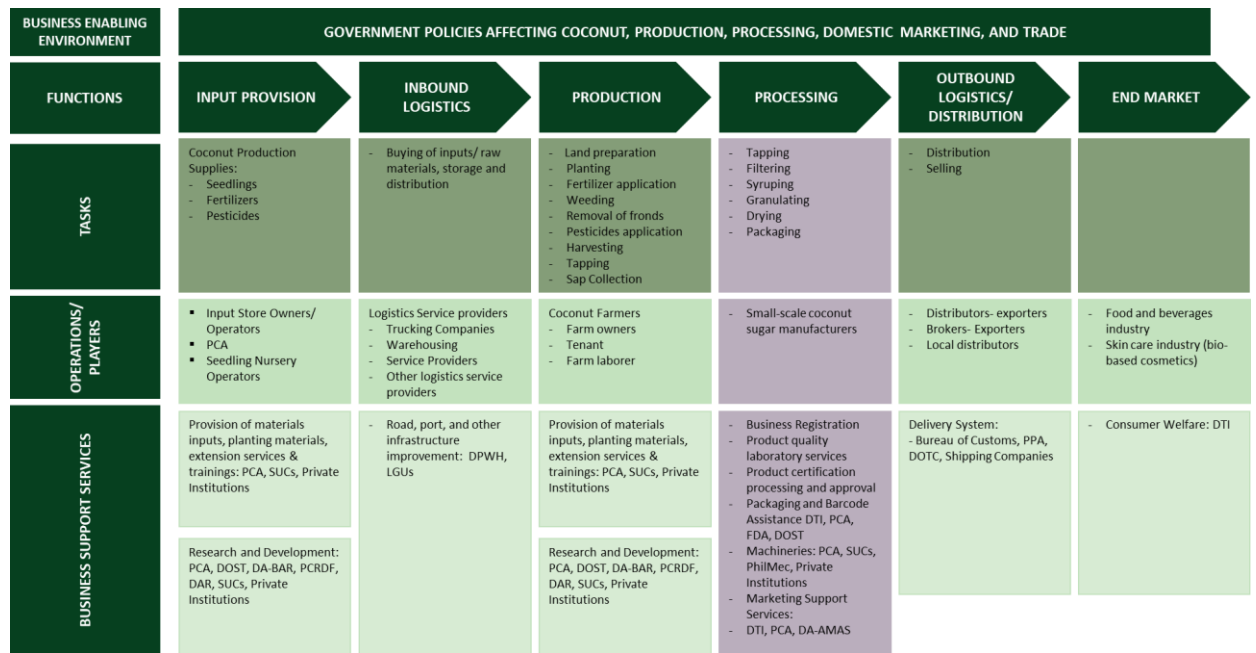


Figure 5. Validated Value Chain Map of Coconut Sugar

Six main aspects support the coconut sugar sector, as shown in the COCOFIRM Road Map. The creation of 33 coco sugar processing factories in Mindanao, for example, is one of the strengths. (2) The Philippines is also known for producing the most coconut sap sugar globally. Approximately 70% of the country's coco sugar production is exported, with the remaining 30% going towards local use. (3) PCA's active involvement in the transfer of technology and the development of processing facilities. (4) The Alabat model in the Luzon cluster, which combines support services from local government and other government agencies, is already a successful business model. 5) Compared to other sugar sources, coco sugar has a low glycemic index and is a healthier alternative. The rising popularity of coconut sugar as a natural sweetener alternative to table sugar

was further reinforced by a debate drawn from the COCOFIRM road plan. Coconut sugar is a better sweetener alternative because of its organic origin, low Glycemic Index (GI), nutritional content, and ingredients from natural sources (Costales, 2019). Aside from that, most importers in Europe are from the United Kingdom of Great Britain and Northern Ireland (UK), Belgium, Denmark, Germany, France, and the Netherlands (Figures 6 and 7). (6) In the worldwide market, Philippine coconut sugar is competitive in terms of quality.

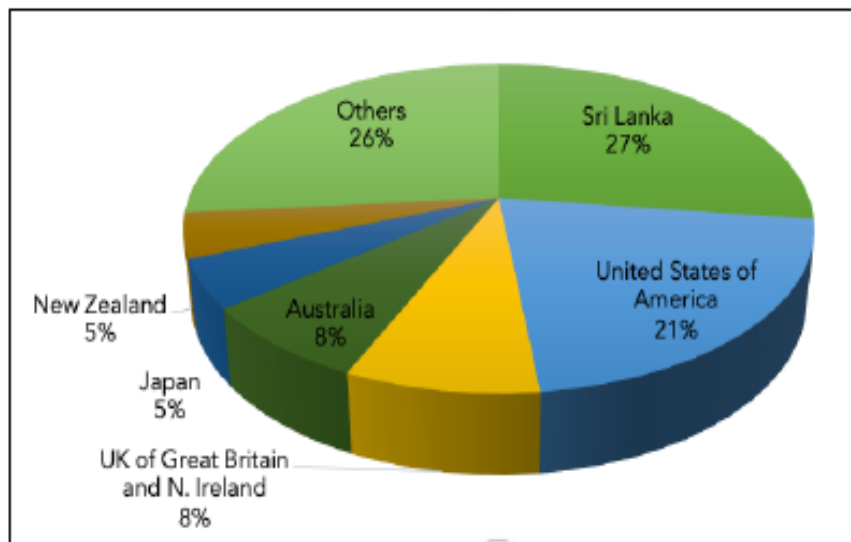


Figure 6. Market Shares of importing countries in the Philippines' export volume of coconut sugar, 2017-2019 (Source: PCA and PSA, as extracted from the COCOFIRM Road map)

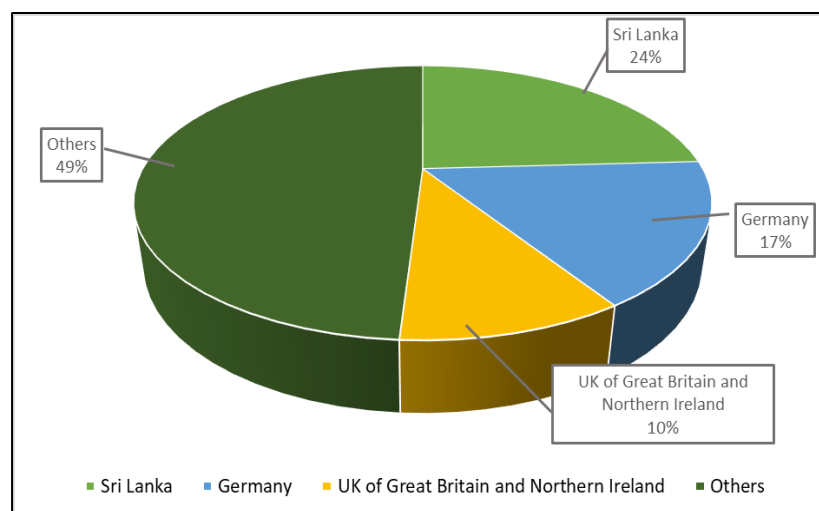


Figure 7. Market Shares of importing countries in the Philippines' export volume of coconut sugar, 2020 (Source: PSA, 2020)

1.2.1 Industry Processing Capacity

In 2020, there were 57 coconut sugar processors in the country. The coconut sugar processing plants are functioning in 9 regions: Region 3, 4, 6, 8, 9, 10, 11, 12, and CARAGA. The highest number of coconut sugar processing plants is located in Mindanao. They have 44 plants (77%) across Region IX to XIII, as shown in Table 13. The remaining 23% are scattered in Visayas and Luzon islands, such as Regions III and IV-A (7%) and Regions VI and VIII (16%).

Table 13. Number of operating coconut sugar processing plants across regions in the Philippines, 2020

REGION	NUMBER OF PROCESSING PLANTS	PERCENT SHARE
Region III (Aurora)	1	1.75%
Region IV (Quezon)	3	5.26%
Region VI (Capiz, Iloilo, Bacolod, Negros Occidental)	8	14.04%
Region VIII (Samar/Leyte)	1	1.75%
Region IX (Zamboanga Del Norte)	3	5.26%
Region X (Bukidnon, Camiguin, Lanao Del Norte, Misamis Occidental, Ozamiz City, Misamis Oriental)	15	26.32%
Region XI	2	3.51%
Region XII (South Cotabato, General Santos City, North Cotabato, Sarangani Province, Sultan Kudarat, Cotabato)	20	35.09%
Region XIII (CARAGA)	4	7.02%
Total	57	100

(Source: Department of Trade and Industry 2020-2021)

"Most MSME coco sugar processor-exporters are small and medium-size based on capital assets," writes Costales (2019). In general, the degree of technology utilized in coco sugar production is still based on the traditional way of processing coco sugar. Only a few processors specialize in automated processing, such as Benevelle Corporation and Treelife. They also produce other products

since sap can be processed into different forms: coco vinegar, coco balsamic, coco jam, coco cider, coco wine, and coco spirit (lambanog). Treelife and Benevelle corporations have an integrated coconut processing plant near the coconut farms they manage and operate. Some sugar manufacturing companies, particularly those that make intermediate goods like coco syrup, set up shops in metropolitan areas with reliable electricity and water supply. Processors can directly process the sap into coco sugar or get coco syrup from local processors, who then turn it into sugar. The village-level processors are micro-and small entrepreneurs and farmers who employed forward integration.”

1.2.2 Markets

Like other Philippine coconut products, the coconut sugar industry aims to acquire a significant export market gain. According to PSA data, the volume of coconut sugar output and its export value increased (Figure 8). From 2017 through 2020, the Philippines exported 264.7 metric tons each year, earning an average of PhP 42.309 million. Coconut sugar has a varied market that spans roughly 24 nations worldwide. Sri Lanka, Germany, the United States, the United Kingdom of Great Britain, and Northern Ireland were the top overseas destinations for coconut sugar exports from the Philippines from 2017 to 2020. Most coconut sugar's export value and volume were traded in Sri Lanka within four years, reflecting 44% of the total share. It is also important to note that the Philippines still imports coconut sugar despite its relatively increasing exportation trade. The country primarily imported coconut sugar from Indonesia and Pakistan. However, PSA data from 2017-to 2020 shows a decreasing trend in importation volume and value (Table 14). In 2020, the Philippines was ranked 39th with a share in exports of 0.17% and 9th with a share in imports of 2.35% (Tridge: 2020).



Figure 8. Philippine export volume and value of coco-sugar, 2017-2020 (Source: PSA)

Table 14. Coconut Sap Sugar Export and Import Data (2017-2020)

YEAR	2017	2018	2019	2020
Import Volume (Metric Ton)	6.06	-	36.09	3.87
Import Value (PHP):	969,746.40	-	6,423.20	507,314.88
Country Source:	Indonesia (100%)		Pakistan (100%)	Indonesia (100%)
Major Export Market:	-	Sri Lanka (Ceylon)- 11.2% USA- 59.6%	Sri Lanka- 44.0% UK of Great Britain and Northern Ireland- 12.8%	Sri Lanka- 24.10% Germany- 16.80% UK of Great Britain & Northern Ireland- 10.10%
Note: - Data not Available				

(Source: PSA)

The Philippines has a minimal comparative advantage in manufacturing and exporting coconut sap sugar. Compared to Indonesia's coconut sap sugar, which is marketed at a lower price due to the higher labor costs of tapping coconut sap in the country, the Philippine coconut sap sugar is not price and cost competitive. Therefore, it is advised that technology be used to mechanize or automate the

tapping or planting of dwarf and hybrid trees for sap production. The coco sugar business is also under threat from adulteration right now. Given the rise in diabetes, cardiovascular diseases (CVD), obesity rates, and changes in dietary habits, the country should take advantage of the low glycemic index of coco sugar. However, due to the persistent dependence on sugarcane-based sweeteners, which are comparatively cheaper, the rise in local demand for coco sugar may be slow-moving. The coco sugar exporter in the Philippines is shown in Table 15.

For unconventional coconut products like virgin coconut oil and coco sugar, Costales (2019) claimed that the marketing of both products is export-oriented based on PCA and industry sources. About 70 percent of the country’s virgin coconut oil and coco sugar output flow to export markets, with 30 percent going to the local market. According to Costales' TRAVERA survey, around 77 percent of the sugar sales of the companies surveyed between 2015 and 2017 were targeted toward the export market.

Coco honey or syrup is another product made from coco sap that has lately been available for export. From the only available data at hand, the volume of coco honey/sugar exported by the country revealed a fluctuating behavior. For example, the coco sap product exports declined from 382.07 MT worth about US\$ 1.53 million in 2017 to 141.67 MT worth US\$ 508 270 in 2018 and then grew again to 269.70 MT in 2019 from 382.07 MT worth about US\$ 1.53 million in 2017 (Table 16).

Table 15. Export volume and value of coco honey/syrup, Philippines, 2017-2019

Year	Export Volume (MT)	Export Value (FOB \$US)
2017	382.07	1,526,519
2018	141.67	508,270
2019	269.70	887,156
Annual Average (2017-2019)	264.48	973,982

(Source: PCA and PSA, as extracted from the COCOFIRM Road map)

2 HVCP INDUSTRY CONSTRAINTS AND OPPORTUNITY ANALYSIS

2.1 Coco Coir Industry Constraints and Opportunity Analysis

This section highlights the coco coir industry's constraints and opportunities analysis (COA) based on the virtual FGD with coconut industry stakeholders. First, it provided a national perspective of the industry's challenges and bright prospects. It then proceeds into the regions by presenting the regional COAs. While the regional COAs provide specific details into the contexts of the constraints and opportunities, they affirm and reflect the general perspectives given by the national-level COA.

2.1.1 National Industry COA

An industry-wide COA was done to strengthen the depth of the industry Value Chain Analysis for coco coir. The key informant value chain stakeholders and players participating in the virtual forum identified key constraints and opportunities. Discussions hosted by DTI for each of the primary functions of the coco coir industry – input provision, production, transformation, distribution, and final sale (Table 16 and Table 17).

The following are key points expressing the main messages of the results of COA.

- The items listed as constraints and opportunities were individually considered, reflected on in terms of underlying root causes or areas where an opportunity may be exploited best, and eventually clustered into the five broad area headings given below:
 - High-value agro-industrial products.
 - Production and processing competitiveness and efficiency.
 - Linkages and cohesion of coco coir value chain operators.
 - Access and share in stable markets; and
 - Enablers' convergence and complementation.

Table 16. Validated National Industry Level Constraints for Coco Coir

INPUT PROVISION	PRODUCTION	TRANSFORMATION	DISTRIBUTION	FINAL SALE
Mismatch of Government Interventions to Specific needs/ No meeting of agencies concerned with the industry				
Untimely provision of support				
Lack of information dissemination of PNS of coco coir and peat products	The inefficient capacity of producers in meeting the product standard requirement of the market	Outdated technology for processing/Lack of modern equipment for core twining/weaving	Difficulty in consolidating coco coir from small, fragmented, and sometimes difficult to access coconut farms; high inbound logistics cost	
Ineffective implementation of determining the right location and correct scale/capacity of the processing facilities	Small capacity of coir processing plants; hence, production of coir products is not sufficient to meet large orders	Ineffective utilization of decorticating equipment/machine	High inter-island transport cost	
No organized coconut fiber entity can represent the industry	Variability in the quality of coco coir twine/peat	High processing cost (i.e., electricity and labor cost) compared with India	Lack of market research on more value-added coir products	
	The occurrence of low pressure and heavy rains makes it difficult for farmers to dry coconut fiber/coco peat	The younger generation may not be enticed to engage in coco coir processing	Philippine coco coir/peat products are less price competitive in the export market compared to India and Sri Lanka	
			Very low commercial utilization of coconut husks – only 8% are commercially utilized from the 14 billion nuts annual production	

Table 17. Validated National Industry Level Opportunities for Coco Coir

INPUT PROVISION	PRODUCTION	TRANSFORMATION	DISTRIBUTION	FINAL SALE
<ul style="list-style-type: none"> • Existence of government to support the development of the coir industry • Available financing window for the coco coir industry • Availability of technologies and technical experts 	<ul style="list-style-type: none"> • RA 10068 Organic Agriculture Act recommends the utilization of cocopeat 	<ul style="list-style-type: none"> • Commercialization of existing and efficient technology on value-adding of coco fiber and coco peat 	<ul style="list-style-type: none"> • RA 11524: An Act Creating Coconut Farmers and Industry Trust Fund mandates the use of geonets/coconuts bioengineering for DPWH projects • MEMO circular no. 25, by the office of the president: mandating all government instrumentalities to use cocopeat and geonets for erosion control for government projects. • Increasing local demand for coco peat as a soil conditioner and growing medium in agriculture • Sustained advocacy on “May Pera sa Bunot” • Domestic market promotion program for the use of other coir products • Market Research on the market trends and uses of other coco coir fiber and peat products • Extensive market promotion program, including participation in international fairs and exhibits • Growing demand in the international market for coco peat and coir products 	

The coco coir industry stakeholders also utilized the five areas above to capture and state five significant challenges facing today's industry. They have agreed that if these constraints are addressed strategically in a significant way through this Roadmap, they will collectively unlock the latent potentials of the coco coir industry as an effective partner of government toward a pro-people pro-planet, and pro-profit development agenda.

The coir value chain players have remained generally unorganized, uncoordinated, and unconnected in their business decisions and actions. It prevented the industry from – a) developing and growing at a much faster rate, b) maximizing opportunities and benefits for collaborative decisions and actions and raising the overall capacity of the industry toward becoming a significant supplier of high value-added coco fiber-/peat-based products in the world market. There is a need for the industry to translate the vast projected demands for geonets locally to more solid and completed business transactions while intensifying its efforts continuously at developing new markets locally, first then abroad. This will require mastering the appropriate bioengineering technology protocols that should direct geonet applications and installations in different environmental characteristics and contexts. This should also mean the need for proactively telling the story of the coco coir industry more compellingly and relevant to the times. Furthermore, it is also necessary to match these efforts with aggressive market development initiatives, i.e., networking, market prospecting, and creation.

It should be noted that the coco coir industry is yet to diversify its product range with more high value and sophisticated coco fiber-/peat-based products that will enjoy broad acceptance from both local and foreign buyers, thus fuelling and strengthening the growth imperatives of the industry. Investments in product research and development are relatively low, thus keeping the industry away from newer and innovative application ideas for cocoa-based materials. The industry needs to beef up its market intelligence on emerging local and foreign buyers' product preferences and purchasing behaviours to exploit consumer trends, needs, and requirements in the products they produce and sell.

However, the overall development performance of the coco coir industry is hampered on the ground by some farm-level (production) and firm-level (processing) inefficiencies, thus reducing its capacity to compete in terms of price,

volume, and, to some extent, quality of products produced. Inefficiencies result from, among others, the non- or limited application of scientifically proven agricultural and manufacturing practices that respectively optimize crop yield potentials or productivity at the processing plants; low level of skills and knowhow of agro-industrial workers; lack of access to technology-inducing productivity; and general inadequacy of many operators to run their coco coir farms or processing plant in a business-like manner.

The government enablers are learning fast from the costly lessons of unconcerted actions and support extended to the coco coir industry marked by duplication, incompleteness of business support packages, and some non-operability of some inappropriately specified equipment provision. They are now resolved to improve how the agencies concerned fulfill their convergence and complementation mandates in industry development, harmonize their programs and projects and coordinate and support each other more in program and project steering, implementation, monitoring, and evaluation.

2.1.2 Regional COA

The following tables constitute the consolidated region-specific COAs categorized according to five headings: Production/Supply; Operational/Technical; Marketing; Financial; and Institutional Policies. Table 18 presents the Regional Constraints framed and identified by five areas, while Table 19 shows the Regional Opportunities identified by five areas. The following data were supplied by the previous road-mapping output generated by the National Coco Coir Industry Cluster Technical Working Group and DTI. The coconut stakeholders validated the following information during Focused Group Discussions held by DTI. The expressed Philippine Coco Coir Industry Roadmap constraints and opportunities for most parts mirror the national COA results but are lending more specific contexts and details to reflect individual regions' realities.

Table 18. Validated Regional Industry Level Constraints for Coco Coir

REGIONS	CONSTRAINTS				
	PRODUCTION	OPERATIONAL/ TECHNICAL	MARKETING	FINANCIAL	INSTITUTIONAL POLICIES
LUZON	<ul style="list-style-type: none"> Lack of knowledge in improving coco coir products; Insufficient supply and no fund release or budget; Infestation; inaction by farmers 	<ul style="list-style-type: none"> High operation cost (High demand on human resources); Low efficiency of equipment; High production cost Need a more efficient decorticating machine. 	<ul style="list-style-type: none"> Philippine coco coir/peat products are less quality competitive in the export market compared to India and Sri Lanka 	<ul style="list-style-type: none"> Lack of knowledge in filing and gathering requirements needed for financial assistance 	<ul style="list-style-type: none"> Seasonal demand for coco-coir; coco-peat & coco-net
VISAYAS	<ul style="list-style-type: none"> Limited access to efficient technologies and equipment Difficulty in consolidating husks from small, fragmented, and sometimes difficult to access coconut farms; high inbound logistics cost 	<p>Re-adjustment of costing and pricing of coco coir by-products decreased interest in coco twiners and coconut weavers.</p> <p>Low technology development; Less efficient decorticating machines</p>	<p>Lack of consolidators; Lack of market awareness; Lack of exporters; Inappropriate baling machine</p>		<p>Minimal to no support from government agencies in providing advanced technology for coir processing capable of meeting international standards</p>
MINDANAO	<ul style="list-style-type: none"> Inefficient capacity of producers in meeting the product standard 	<ul style="list-style-type: none"> Some machinery has poor designs 	<ul style="list-style-type: none"> Lack of information dissemination of "Code of Practice" expressing the 		<ul style="list-style-type: none"> The government policies in support of the industry are

REGIONS	CONSTRAINTS				
	PRODUCTION	OPERATIONAL/ TECHNICAL	MARKETING	FINANCIAL	INSTITUTIONAL POLICIES
	requirement of the market		required standard of coco coir and peat products		not strictly implemented
	<ul style="list-style-type: none"> • Difficulty in consolidating husks from small, fragmented, and sometimes difficult to access coconut farms; high inbound logistics cost • Very low commercial utilization of coconut husks – only 8% are commercially utilized from the 14 billion nuts annual production 	<ul style="list-style-type: none"> • Ineffective implementation of determining the right location and correct scale/capacity of the processing facilities 	<ul style="list-style-type: none"> • Philippine coco coir/peat products are less price competitive in the export market compared to India and Sri Lanka 		

Table 19. Validated Regional Industry Level Opportunities for Coco Coir

REGIONS	OPPORTUNITIES								
	PRODUCTION/SUPPLY		OPERATIONAL/ TECHNICAL		MARKETING		FINANCIAL	INSTITUTIONAL POLICIES	
LUZON	Abundant raw materials		Limited competition in terms of enterprise engaged in coco coir processing	Limited competition in terms of enterprise engaged in coco coir processing	Opportunities to participate in trade fairs; Huge demand for export; Worldwide trend on the use of green products;	DPWH, NIA, & Mining Companies projects for soil erosion	Presence of financing institutions as possible sources of funding	RA 10068 Organic Agriculture Act recommends the utilization of cocopeat	DTI SSF and DOST SET-UP program can be tapped to expand capacities and improve the machinery of coir processing plants
VISAYAS	There are enough coconut husk that was not processed into by product	With the operationalization of the Tufting facility/ plant in Javier, Leyte (Joint project of PCA and the LGU), it will require 50,000 hanks a day/coir input.	Standardization of small decorticating machines and economic-sized business model	Standardization of small decorticating machines and economic-sized business model	Rising DPWH, Mining projects' demand for geonets	Private sectors aim to have 0 plastic production of pots.	Presence of financing institutions as possible sources of funding Presence of PRDP assistance for the coop.-based coco coir processors; SB Corp readiness to provide financing assistance for coco coir processors	RA 11524: An Act Creating Coconut Farmers and Industry Trust Fund mandates the use of geonets/coco nuts bioengineering for DPWH projects	RA 10068 Organic Agriculture Act recommends the utilization of cocopeat

REGIONS	OPPORTUNITIES								
	PRODUCTION/SUPPLY		OPERATIONAL/ TECHNICAL		MARKETING		FINANCIAL	INSTITUTIONAL POLICIES	
						Growing demand in the international market for coco peat and coir products	Presence of financing institutions as possible sources of funding		Sustained advocacy on “May Pera sa Bunot”
MINDANAO		Commercialization of existing and efficient technology on value-adding of coco fiber and coco peat		Availability of technology		DPWH and NIA Projects in the region	Available funding from the government (PCA, DTI, DAR, others)		Existence of government for supporting the development of the coir industry

2.2 VCO Industry Constraints and Opportunity Analysis

The constraints and opportunities for Virgin Coconut Oil (VCO) were presented for validation during the focus-group discussion conducted for the three island groups: Luzon, Visayas, and Mindanao. Although these challenges and bright prospects facing the VCO industry were taken from The Coconut Farmers and Industry Roadmap (2021-2040), these factors must be presented for validation to help us craft the roadmap for the Virgin Coconut Oil Industry

2.2.1 National Industry COA

The national constraints and opportunities for VCO can be presented using the value-chain approach. The constraints and opportunities were identified for each of the primary functions of the virgin coconut oil industry; inbound logistics, production, trading and marketing, processing, and end-market.

Key industry opportunities

- A. **Efficiency and execution of government support services and programs.** Business Support Services for VCO consisted of (1) Available simple, low-cost VCO processing technologies suitable for small/household-based business enterprises, (2) Review and updating of PNS/BAFPS 22:2507) for VCO, (3) Licensing, monitoring, and regular inspection of VCO producers/plants for GMP and HACCP compliance to ensure quality and safe products for human consumption, and (4) Accreditation of government and private laboratories in various locations for VCO quality analysis. Nevertheless, the signing of the Republic Act (RA) No. 11524 or the Coconut Farmers and Industry Trust Fund (CFITF) Act by Pres. Rodrigo R. Duterte, on February 26, 2021, would mean uplifting the livelihood of millions of farmers and sustaining the development of the country's coconut industry. Therefore, this opportunity should be considered as this will modernize the entire coconut industry.

Readily available programs from DTI to fund VCO processing equipment thru the Shared Service Facility, availability of technology and innovation

support from the government on VCO Processing, e.g., facilities upgrading, packaging improvement, consultancy/training on product quality enhancement, among others, increasing government-industry-academe collaboration on R&D and innovation, especially through the Regional Inclusive Innovation Center program- RIIC is a program of DTI, DOST, DICT, CHED etc., availability of human resource engaged in the continuous improvement of the VCO quality. In addition, government support initiatives for the coconut industry and VCO production were important opportunities to consider.

B. Competitiveness of the MSME VCO processing sector. One of the key factors influencing the global demand for virgin coconut oil is its health benefits. Several studies have shown the beneficial effects of virgin coconut oil, including its promising clinical study on effectivity against COVID-19 and African Swine Fever. Similarly, the wider application of virgin coconut oil to beauty, cosmetics, and personal care products such as soaps, lotions, massage oils, beauty creams, lipsticks, and other hair and skincare products is expected to stimulate further growth of the virgin coconut oil market. Incorporating locally available herbal plants in VCO for health and wellness with technical support on the integrity of the product was brought up during the FGD. Some challenges that were validated in the FGD included (1) Competition for the supply of nuts as raw materials because most new plants have emerged in locations where oil mills and Desiccated Coconut plants are already existing, and (2) MSMEs also lack technical know-how on producing good quality VCO and information system to educate local and export consumers and buyers, (3) MSMEs cannot secure necessary registrations/licenses, and (4) MSMEs limited funds to support flexibility in their operations. These challenges render MSMEs uncompetitive.

C. Global market quality standards of VCO. Gaining popularity in the local and international market, particularly for organically certified products, can cater to demands in Europe. This opportunity was validated during the focus group discussion. However, we do not

undermine the growing acceptance of VCO in the export market as a healthful product, which was expressed in the FGD. Moreover, there is an increasing demand in domestic and export markets for organic and naturally processed products such as the VCO. The only challenge here was the flooding of imports from other countries with better VCO quality, which would make our VCO less competitive.

Dissemination of market information (eCommerce), Limited access to the export market due to various constraints (export requirements, certifications & huge minimum orders from export buyers) were identified as trading/marketing challenges raised during the FGD.

Key Industry Constraints

The three areas above were used to capture the three major challenges facing the VCO industry, as also validated by the three clusters during the focus group discussion.

1. The challenges in the efficiency and execution of government support services and programs were validated in the FGD and are due to the lack of unity in the quality standard and processing method for the local VCO industry, the limited number of agriculturists and consultants, and the high cost of food-grade processing equipment for the upgrading of existing as validated in the FGD. Moreover, the short shelf life of products, lack of awareness of the benefit of VCO, incomplete/lack/limited testing facilities, ex. Antioxidant test, plasticizer residue (Expensive tests) which hampers product dev. w/c are required in acquiring required licenses/permits were new additions to these challenges.
2. The competitiveness of the MSME VCO processing is at a disadvantage and prevents the VCO industry from competing with large-scale companies that use expeller in VCO mass production, where large companies can lower the price due to economies of scale. In addition, the lack of capacity of MSMEs to secure necessary registrations and licenses, the high international shipping cost and logistical cost, and the prohibitive cost of organic certification (PHP 0.5M for 100 hectares), which is renewable yearly, also puts the MSMEs uncompetitive due to its limited funds. There is also a

challenge in the lack of adequate regulation of VCO producers and the lack of product quality testing laboratories in coconut supply grid areas in Visayas and Mindanao, resulting in the proliferation of low-quality VCO products.

3. The challenge of VCO in the global market is the flooding of imports from other countries with better VCO quality, which would make our VCO less competitive. Likewise, there is limited access to the export market due to various constraints (export requirements, certifications & huge minimum orders from export buyers). Moreover, the availability of substitute oils that have similar uses to VCO compromises the rapid acceptance of VCO as a healthful product, while there is a lingering effect of negative campaign that coconut oil is an unhealthy oil.

2.2.2 Regional COA:

Regarding the regional industry constraints and opportunities validated during the virtual stakeholder’s forum, Table 20 to Table 24 present the key industry constraints, while Table 25 to Table 29 summarize the key industry opportunities. The dichotomy of issues (constraints or opportunities) impacting the entire HVCP industry is based on how they influence a specific segment along the value chain.

Table 20. Validated Regional Industry Level Constraints in the Production Sector for VCO

REGIONS	CONSTRAINTS	
	PRODUCTION	
LUZON	<ul style="list-style-type: none"> ● Competition for the supply of nuts as raw materials because most new plants have emerged in locations where oil mills and DC plants are already existing ● Price and supply competition for whole nuts between DCN-VCO processors and MSMEs, with the former offering a higher price; and other traditional products processors ● Expeller-derived VCO companies produce in large volumes and lower, rendering smaller firms uncompetitive without market classification based on the process. ● Other VCO producing countries, Thailand, and Indonesia, are fast-moving in product development 	
VISAYAS		<ul style="list-style-type: none"> ● Aging farmers and coconut trees ● Low yield of coconut trees due to climate change
MINDANAO		

Table 21. Validated Regional Industry Level Constraints in the Operational/Technical Sector for VCO

REGIONS	CONSTRAINTS	
	OPERATIONAL/TECHNICAL	
LUZON	<ul style="list-style-type: none"> ● MSMEs cannot compete with large-scale companies that use expeller in VCO mass production; hence, large companies can lower the price due to economies of scale ● MSMEs' limitations in terms of capacity to meet the demand for VCO ● The difference in organoleptic characteristics identified by sensory evaluation due to different VCO processing methods not considered in market pricing and classification ● An increasing number of VCO producers due to its potential as a profitable enterprise ● The lingering effect of the negative campaign that coconut oil is an unhealthy oil 	
VISAYAS		<ul style="list-style-type: none"> ● Lack of capacity of MSMEs to secure necessary registrations/licenses ● The lack of adequate regulation of VCO producers results in the proliferation of low-quality VCO products ● Farmers lack training in writing proposals to avail of the grants/ capacity building ● A limited number of agriculturists and consultants
MINDANAO		<ul style="list-style-type: none"> ● The lack of adequate regulation of VCO producers results in the proliferation of low-quality VCO products ● MSMEs lack technical know-how in producing good quality VCO and information systems to educate local and export consumers and buyers ● High international shipping cost ● MSME's limited funds to support flexibility in operations ● Incomplete/lack/limited testing facilities, ex. Antioxidant test, plasticizer residue (Expensive tests) which hampers product dev. w/c are required in acquiring required licenses/permits ● Lack of product quality testing laboratories in coconut supply grid areas in Visayas and Mindanao ● High logistical cost

Table 22. Validated Regional Industry Level Constraints in the Marketing Sector for VCO

REGIONS	CONSTRAINTS	
	MARKETING	
LUZON	<ul style="list-style-type: none"> • Availability of substitute oils that have similar uses 	
VISAYAS		
MINDANAO		<ul style="list-style-type: none"> • Limited access to the export market due to various constraints (export requirements, certifications & huge minimum order from export buyers)

Table 23. Validated Regional Industry Level Constraints in Financial Sector for VCO

REGIONS	CONSTRAINTS	
	FINANCIAL	
LUZON		
VISAYAS		
MINDANAO		<ul style="list-style-type: none"> • The high-interest rate of Financing institutions for individual borrowers and non-coop borrowers • High cost of food-grade equipment for upgrading existing VCO processing centers.

Table 24. Validated Regional Industry Level Constraints in the Institutional Policies Sector for VCO

REGIONS	CONSTRAINTS	
	INSTITUTIONAL POLICIES	
LUZON	<ul style="list-style-type: none"> • The prohibitive cost of organic certification (PHP 0.5M for 100 hectares) renewable yearly 	
VISAYAS		
MINDANAO		<ul style="list-style-type: none"> • Misuse or ineffective use of the coconut levy

Table 25. Validated Regional Industry Level Opportunities in the Production Sector for VCO

REGIONS	OPPORTUNITIES	
	PRODUCTION/SUPPLY	
LUZON	<ul style="list-style-type: none"> ● Potential further increase in demand with a promising clinical study on the effectiveness of VCO against COVID-19 and a promising study on its use against African Swine Fever 	
VISAYAS		
MINDANAO		<ul style="list-style-type: none"> ● Vast land area potential for expansion for coconut plantation ● Incorporating locally available herbal plants in VCO for health and wellness with technical support on the integrity of the product. Priority sector among partner agencies ● Good quality coconut variety

Table 26. Validated Regional Industry Level Opportunities in the Operational/Technical Sector for VCO

REGIONS	OPPORTUNITIES	
	OPERATIONAL/TECHNICAL	
LUZON	<ul style="list-style-type: none"> ● Base product of many high-end beauty products and health products ● Available simple, low-cost VCO processing technologies suitable for small/household-based business enterprise ● 42 VCO processing plants in 9 regions, while 21 DCN processing plants are also flexible to produce VCO ● An increasing number of VCO producers 	
VISAYAS		<ul style="list-style-type: none"> ● Readily available programs from DTI to fund VCO processing equipment thru the Shared Service Facility
MINDANAO		<ul style="list-style-type: none"> ● The government's availability of technology and innovation support on VCO Processing, e.g., facilities upgrading, packaging improvement, consultancy/training on product quality enhancement, etc. ● Availability of human resources engaged in the continuous improvement of the VCO quality

Table 27. Validated Regional Industry Level Opportunities in the Marketing Sector for VCO

REGIONS	OPPORTUNITIES	
	MARKETING	
LUZON	<ul style="list-style-type: none"> ● Gaining popularity in the local and international markets, particularly for organically certified products, can cater to demands in Europe ● Philippine VCO price and quality competitive meeting PNS and global standards ● Highly priced commodity among the lines of coconut product ● Established niche market as a functional food for its various health and nutritional benefits ● The Philippines is the top VCO producer and exporter in the world; the total volume and value of exports increased at 45% and 55% annual growth rates from 2009-to 2019, respectively 	
VISAYAS		
MINDANAO		<ul style="list-style-type: none"> ● Growing acceptance of VCO in the export market as a healthful product ● Increasing demand in domestic and export markets for organic and naturally processed products such as the VCO

Table 28. Validated Regional Industry Level Opportunities in the Financial Sector for VCO

REGIONS	OPPORTUNITIES	
	FINANCIAL	
LUZON	<ul style="list-style-type: none"> ● Republic Act (RA) No. 11524 or the Coconut Farmers and Industry Trust Fund (CFITF) Act signed by Pres. Duterte, on February 26, 2021, uplifts the livelihood of millions of farmers and sustains the development of the country's coconut industry. 	
VISAYAS		
MINDANAO		

Table 29. Validated Regional Industry Level Opportunities in the Institutional Policies Sector for VCO

REGIONS	OPPORTUNITIES	
	INSTITUTIONAL POLICIES	
LUZON	<ul style="list-style-type: none"> Review and updating of PNS/BAFPS 22:2507) for VCO Licensing, monitoring, and regular inspection of VCO producers/plants for GMP and HACCP compliance to ensure quality and safe products for human consumption Accreditation of government and private laboratories in various locations for VCO quality analysis 	
VISAYAS		<ul style="list-style-type: none"> Government support initiatives for the coconut industry and VCO production
MINDANAO		<ul style="list-style-type: none"> Government support initiatives for the coconut industry and VCO production Increasing government-industry-academe collaboration on R&D and innovation, especially through the Regional Inclusive Innovation Center program- RIIC is a program of DTI, DOST, DICT, CHED etc Government support initiatives for the coconut industry and VCO production

2.3 Coco sugar Industry Constraints and Opportunity Analysis

The outcomes of the coco sugar industry's limitations/ constraints and opportunities analysis (COA) from the SWOT and PAP's workshop results during the FGDs are presented in this chapter. First, this provides a national perspective on the industry's difficulties and prospects. Afterward, it delves into the regional COAs. Although regional COAs provide more detailed information on the limits and possibilities in their circumstances, they validate and reflect the national COA's overall viewpoint.

2.3.1 National Industry COA

An industry-wide COA was conducted following the Value Chain segments. It implies that restrictions and opportunities were recognized for each of the primary operations of the coco sugar sector – input provision, production, transformation, distribution, and ultimate sale. The results of the COA are summarized in Table 30 and Table 31. The following points emerged because we attempted to synthesize and extract the primary signals that the COA findings were conveying.

There are fifteen elements of weakness factors that influence the development of the coconut sugar industry, including the scarcity of planting materials for dwarf types that may be used to make sugar, as well as limited skilled coconut sap tappers and mechanical technology for sap collection affecting the input and the production sector. Other industry weaknesses affect the processing sector, marketing, and logistics.

Table 30. Validated National Industry Level Constraints for Coco Sugar

INPUT PROVISION	PRODUCTION	TRANSFORMATION	DISTRIBUTION	FINAL SALE
	<ul style="list-style-type: none"> The weak synergy between agencies and lack of coordinated continuity. 			
	<ul style="list-style-type: none"> Lack of governing bodies to specifically regulate and consolidate the coco sweetener industry. 			
<ul style="list-style-type: none"> Lack of skilled coconut sap tappers and mechanical technology for sap collection 	<ul style="list-style-type: none"> Infestation of pests and diseases of coconut that will affect sap yield. 	<ul style="list-style-type: none"> Limited number processors 	<ul style="list-style-type: none"> Ineffective Consolidation and limited support to individual and small farmers. 	<ul style="list-style-type: none"> Traders and consolidators dictate prices due to limited access to market
<ul style="list-style-type: none"> Insufficient supply of coconut seedlings of high-yielding dwarf varieties. 	<ul style="list-style-type: none"> Uncompetitive cost of production (e.g., high labor cost) which makes coco sugar less price competitive in the global market 	<ul style="list-style-type: none"> Varying processing technologies resulting in inconsistent quality and adulteration of quality standards. 		<ul style="list-style-type: none"> Increasing concerns about food safety led to stringent entry requirements enforced by institutional buyers.
<ul style="list-style-type: none"> Climatic changes (i.e., heavy rainfall, typhoons, and drought) 	<ul style="list-style-type: none"> Limited capital of coconut farmers/ sap collectors/ producers 	<ul style="list-style-type: none"> Many existing micro-sugar sap processors have no permits, licenses, or certifications. 		<ul style="list-style-type: none"> Cost advantage of global competitors (e.g., Indonesia's VS Philippines production cost)
	<ul style="list-style-type: none"> Low production volume 	<ul style="list-style-type: none"> Unmatched export quality assurance. 		<ul style="list-style-type: none"> lack of market promotions on health benefits
	<ul style="list-style-type: none"> Varying production technologies resulting in inconsistent quality. 	<ul style="list-style-type: none"> MSME's limited processing and packaging facilities 		<ul style="list-style-type: none"> A high number of competitors are trading in the global market.
		<ul style="list-style-type: none"> Stringent requirements for certification and high certification fees (Most of the home-based processors cannot comply with the food and business requirements of the FDA and BFAD (e.g., GMP) 		<ul style="list-style-type: none"> Low domestic demand
		<ul style="list-style-type: none"> Insufficient knowledge of Hazard Analysis and Critical Control Points (HACCP) or organic certification 		
		<ul style="list-style-type: none"> Limited capital of processors 		

Table 31. Validated National Industry Level Opportunities for Coco Sugar

INPUT PROVISION	PRODUCTION	TRANSFORMATION	DISTRIBUTION	FINAL SALE
<ul style="list-style-type: none"> • PCA's active support for technology transfer and provision of processing facilities 				
<ul style="list-style-type: none"> • The successful business model on the convergence of support services from local government and other government agencies, ex. Alabat model 				
<ul style="list-style-type: none"> • DTI shared facilities assistance, DA-PRDP, DOST Set-up program, and PCA's KAANIB enterprise development program, which extends assistance in processing facilities and equipment. 				
<ul style="list-style-type: none"> • Public-Private Partnership- Opportunity to tap DTI and market information through Mintel. 				
<ul style="list-style-type: none"> • Available idle land in Mindanao region for increased production 	<ul style="list-style-type: none"> • Considered one of the world's top producers of coconut sap sugar 	<ul style="list-style-type: none"> • Presence/availability of 33 coconut sugar processing plants 	<ul style="list-style-type: none"> • Available models of CFOs and cooperatives direct links with market and distribution channels in Metro Manila and/or abroad. 	<ul style="list-style-type: none"> • Coco sugar has a low glycemic index and is a healthy option compared to other sugar sources.
	<ul style="list-style-type: none"> • PCA's Strategic Planting/ Replanting and Hybridization Program 	<ul style="list-style-type: none"> • Research projects to develop mechanized sap collection 		<ul style="list-style-type: none"> • Promising market outlook due to growing interest in the health benefits coco sap sugar consumption
	<ul style="list-style-type: none"> • Available skills training on coconut production and sap tapping by ATI, PCA, and academe (e.g., VSU) 	<ul style="list-style-type: none"> • Available technical assistance or training on GMP compliance and financing support for SMEs from PCA, DTI, and DOST. 		

The respondents also stated that compared to Indonesia's coconut sap sugar, which is marketed at a lower price due to the greater labor costs of tapping coconut sap in the nation, the Philippine coconut sap sugar is not price and cost competitive. Therefore, it is advised that technology be used to mechanize or automate the tapping or planting of dwarf and hybrid trees for sap production. The coco sugar business is also under threat from adulteration right now. Most MSME coco sugar processor-exporters are small and medium-sized based on capital assets. In general, the degree of technology utilized in coco sugar production is still based on the traditional way of processing coco sugar. Only a few processors, such as Beneville Corporation and Treelife, are involved in automated processing. The shortage of high-yielding dwarf types of coconut seedlings suitable for coco sugar production and a shortage of trained coconut sap tappers and mechanized sap collecting technologies have all been cited as industry flaws.

As to the coconut sugar industry's external factors, it was validated that there are many factors that influence the development of strategic opportunities, namely the PCA's Strategic Planting/ Replanting and Hybridization Program and DTI shared facilities assistance, DA-PRDP, DOST Set-up program, and PCA's KAANIB enterprise development program, which extends assistance in processing facilities and equipment that strengthen the production and processing sector. In addition, ATI, PCA, and academe (e.g., VSU) provided skills training on coconut production and sap tapping; PCA, DTI, and DOST provided technical assistance or training on GMP compliance and financing support for SMEs; and Public-Private Partnership (PPP) provided access to DTI and market information through Mintel (both social and technical skills). Furthermore, the industry is also given a bright market prognosis due to increased interest in the health advantages of coco sap sugar intake.

There were several risks and threats to the sector as well. For example, climatic changes (e.g., heavy rains, typhoons, and drought), pests and diseases of coconut that affect sap yield, intense price and quality competition in the global market, and growing concerns about food safety resulted in institutional buyers imposing strict entry requirements. The items listed as constraints and opportunities were individually considered, reflected on underlying root causes or areas where

an opportunity could be best exploited, and finally clustered into the five broad area headings given below to reduce the complexity of the COA's wide range of items.

1. Operators in the coco sugar value chain and their network and collaboration.
2. Competitiveness and efficiency in production (farm) and processing (firm).
3. Value addition, product diversification, and industry growth,
4. Having access to and a stake in stable markets; and
5. Complementarity and convergence of enablers

1. Operators in the coco sugar value chain and their network and collaboration.

Increased worldwide competitiveness puts pressure on the coconut industry's value chain actors to enhance their efficiency, including relationships, networks, and collaboration. Getting better structured, having more systematic discussions, addressing shared issues and concerns, and working together to identify methods to handle common obstacles and seek similar objectives are opportunities for coco sugar value chain actors.

2. Competitiveness and efficiency in production (farm) and processing (firm)

Many concerns raised in the COA have to do with the industry's general competitiveness in terms of productivity and efficiency. The factors can be clustered into human resources or people, machinery, method, and materials. Human resources include a lack of skilled coconut sap tappers and mechanical technology for sap collection, a limited number of processors, and insufficient knowledge of Hazard Analysis and Critical Control Points (HACCP) or organic certification. At the same time, a method covering how things are being done includes varying processing technologies resulting in inconsistent quality and adulteration of quality standards and unmatched export quality assurance. In addition, materials and machinery are considered an insufficient supply of coconut seedlings of high-yielding dwarf varieties and limited capital of coconut farmers/ sap collectors/ producers to finance upfront investments such as infrastructure, facilities, and equipment.

3. Value addition, product diversification, and industry growth

The need for new and higher value-added products for coco sugar-based products was listed in the COA. Coconut sugar processors can now get more value from their raw materials and reduce wastage. Capacity building for coco sap and coconut sugar value addition and diversification contributed to opening new product lines for the domestic and global market. Value Addition in coco sap production and coco sugar processing raises potential products for local manufacturing and export diversification, improving and expanding the overall coco sugar industry's domestic and global competitiveness.

4. Having access to and a stake in stable markets

Items such as ineffective consolidation and minimal assistance for individual and small farmers reflect marketing concerns. Due to growing worries about food safety, institutional purchasers have imposed strict entrance restrictions, which has resulted in a lack of domestic demand. There are no health benefits promos on the market, and there are many rivals in the worldwide market. Market share is now universally considered one of the essential factors in determining a company's profitability. In most cases, companies with a large percentage of the markets they serve are much more profitable than their smaller-share competitors.

5. Complementarity and convergence of enablers

There is a lack of genuine collaboration and complementarity among the government agencies that assist the coco sugar business. While the private sector recognizes and appreciates the government's assistance, it only hopes it will be more comprehensive, frictionless, and beneficial to the enterprise. This is echoed by such COA items as the weak synergy between agencies, lack of coordinated continuity, and lack of governing bodies to regulate and consolidate the coco sweetener industry.

2.3.2 Regional COA

The following tables constitute the consolidated region-specific COAs categorized for coco sugar according to five areas, namely, Production/Supply; Operational/Technical; Marketing; Financial; and Institutional Policies. Table 32

presents the Regional Constraints framed and identified by five areas, while Table 33 shows the Regional Opportunities.

Table 32. Proposed PAPs for Regional Constraints: Production/Supply, Operational/Technical, Marketing, Financial, Institutional Policies

REGIONS	CONSTRAINTS	PAPs TO ADDRESS CONSTRAINTS
PRODUCTION SUPPLY		
Luzon	There is an insufficient supply of coconut seedlings of high-yielding dwarf varieties suited for coco sugar processing.	Strategic planting/replanting of outstanding dwarf varieties Adoption of improved farm productivity and quality enhancing technologies
Mindanao	Lack of skilled coconut sap tappers and mechanical technology for sap collection	Train professionalized service crew including “mangangarets”
Mindanao	Climatic changes (i.e., heavy rainfall, typhoons, and drought)	Adaptation of climate-smart technologies for coco sugar production. Enhancement of business continuity planning in Mindanao, e.g., disaster-risk and natural calamities
Visayas	Infestation of pests and diseases of coconut will affect sap yield.	Integration of intercropping by coconut farmers to be more resilient.
OPERATIONAL/ TECHNICAL		
Mindanao	High labor costs make coco sugar less price competitive in the global market.	Adoption of improved farm productivity and quality enhancing technologies
Luzon Visayas Mindanao	MSMEs cannot compete with existing brands in terms of pricing. Packaging, promotion, and distribution.	Develop strategies on price and quality competitiveness of Philippine Coconut Sugar
Mindanao	Ineffective consolidation and limited support to individual and small farmers.	Internal coordination between different cooperatives and players in the coco sugar industry.

Table 32. Continuation...

REGIONS	CONSTRAINTS	PAPs TO ADDRESS CONSTRAINTS
MARKETING		
Luzon	Traders and consolidators dictate prices due to limited access to market	Established coconut-based agribusiness enterprises are market-driven, seamlessly linked from primary production, product processing, and marketing.
	Low domestic demand; higher prices, and lack of market promotions on its health benefits	Market facilitation, linkage, and matching to increase market access and promotion (domestic and export)
Luzon	No standardization: varying production and processing technologies result in inconsistent quality; adulteration by a few local processors may affect the good image of the Philippine coco sugar.	Sanctions to those practicing illegal/ prohibited marketing practices Establish standards for product quality testing Research on technology improvement, particularly in tapping, processing, and product development for new uses and applications of coco sugar.
Mindanao	Thailand's coco sugar is more advantageous in terms of quality in the international market.	Prioritization of market-related strategies for coco sugar.
Mindanao	Indonesia is price and cost-competitive compared to the Philippines because of the former's lower labor cost.	The government should draw out allocated, committed, and expedited budgets for technology innovation, training, and research for SMEs and industry players to gain more exportable products.
	Increasing concerns about food safety led to stringent entry requirements enforced by institutional buyers.	Tapping commercial attaché to create linkage between buyers.
FINANCIAL		
Luzon	Due to limited capital, many existing micro-sugar sap processors have no permits, licenses, certifications (FDA and BFAD), or processing/ packaging facilities.	Special financing window/ credit program for coconut farmers' organizations/ cooperatives to provide production, processing, trading, and microfinancing loans at low-interest rates.

Table 32. Continuation...

REGIONS	CONSTRAINTS	PAPs TO ADDRESS CONSTRAINTS
INSTITUTIONAL POLICIES		
Luzon	There is a weak synergy between agencies and a lack of coordinated continuity or governing bodies to regulate and consolidate the coco sweetener industry precisely.	Setting up market information which could also link industry key players to markets, research institutions, and other VC support service provider
Mindanao		Intensified government partnership and industry players.
Visayas		Enhance capacity building for LGUs to support the coconut industry.

Table 33. Proposed PAPs for Regional Opportunities: Production/Supply, Operational/Technical, Marketing, Financial, Institutional Policies

REGIONS	OPPORTUNITIES	PAPs TO ADDRESS CONSTRAINTS
PRODUCTION SUPPLY		
MINDANAO	The Philippines is the world's top producer of coconut sap sugar	The government should draw out allocated, committed, and expedited budgets for technology innovation, training, and research for SMEs and industry players to gain more exportable products.
LUZVIMINDA	PCA's Strategic Planting/ Replanting and Hybridization Program	Strategic planting/replanting of outstanding dwarf varieties
OPERATIONAL/ TECHNICAL		
LUZVIMINDA	33 coconut sugar processing plants	Capacity building on market negotiation and participation of SMEs in international trade fairs and exhibits
LUZVIMINDA	The successful business model on the convergence of support services from local government and other government agencies, ex. Alabat model	Support direct trading of farmer organizations/ cooperatives to coconut processing companies and institutional buyers
MINDANAO	Available models of CFOs and cooperatives direct links with market and distribution channels in Metro Manila and/or abroad	Co-producers to highlight the marketing strategies of coco sweetener.
LUZON VISAYAS	DTI shared facilities assistance, DA-PRDP, DOST Set-up program, and PCA's KAANIB enterprise development program, which extends assistance in processing facilities and equipment.	Established coconut-based agribusiness enterprises are market-driven, seamlessly linked from primary production, product processing, and marketing.

Table 33. Continuation...

REGIONS	OPPORTUNITIES	PAPs TO ADDRESS CONSTRAINTS
LUZON	Available technical assistance or training on GMP compliance and financing support for SMEs from PCA, DTI, and DOST.	The agency, DTI/PCA, will identify compliant companies per region as a good business model.
MINDANAO	Available skills training on coconut production and sap tapping by ATI, PCA, and academe (e.g., VSU)	Enhancement of business continuity planning in Mindanao, e.g., disaster-risk and natural calamities, capacity building, etc.
MARKETING		
LUZVIMINDA	Philippine coconut sugar is quality competitive in the global market	Market facilitation, linkage, and matching to increase market access and promotion (domestic and export)
VISAYAS	Coco sugar has a low glycemic index and is a healthy option compared to other sugar sources.	Promotion of low glycerin content of coco sugar.
LUZON	Promising market outlook due to growing interest in the health benefits coco sap sugar consumption	Diversify products and uses to widen the base of the NTCPs niche market to other geographical and domestic markets
INSTITUTIONAL POLICIES		
LUZON	PCA's active support for technology transfer and provision of processing facilities.	Enforcement of PD. 1644 which grants additional powers to PCA related to trade on quality standards
LUZON	Research to develop mechanized sap collection	Research on technology improvement, particularly in tapping, processing, and product development for new uses and applications of coco sugar.
VISAYAS		Improvement in technology, especially in the use of mechanical dryers to preserve the shelf life of products.
MINDANAO	Public-Private Partnership- Opportunity to tap DTI and market information through Mintel.	Intensified government partnership and industry players.

3 HVCP INDUSTRY ROAD MAP (2022-2030)

3.1 Coco coir roadmap (2022-2030)

FGD participants were able to generate Projects and Projects (PAPs) presented below. A schematic diagram of the coco coir roadmap is shown in Figure 9. On the island of Luzon, three PAPs are focused on efficient production and processing technology and expanding their product range. Coir FGD Visayas participants stressed the importance of having established market linkages. Thus, Visayas participants have agreed to have four PAPs solely focused on product standardization to achieve market expansion. In Mindanao, participants stressed the need to focus first on little forms of authority in smaller areas, thus, localizing policies that will soon be translated into different action steps. One of the relevant action steps highlighted is having massive information campaigns on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.).

According to Mindanao participants, localization of such policies will result in having institutionalized buyers through the help of designated agencies such as DPWH. It will also provide hope to MSMEs to sell coir products due to the fact that it is anchored to the legislative agenda of local officials.

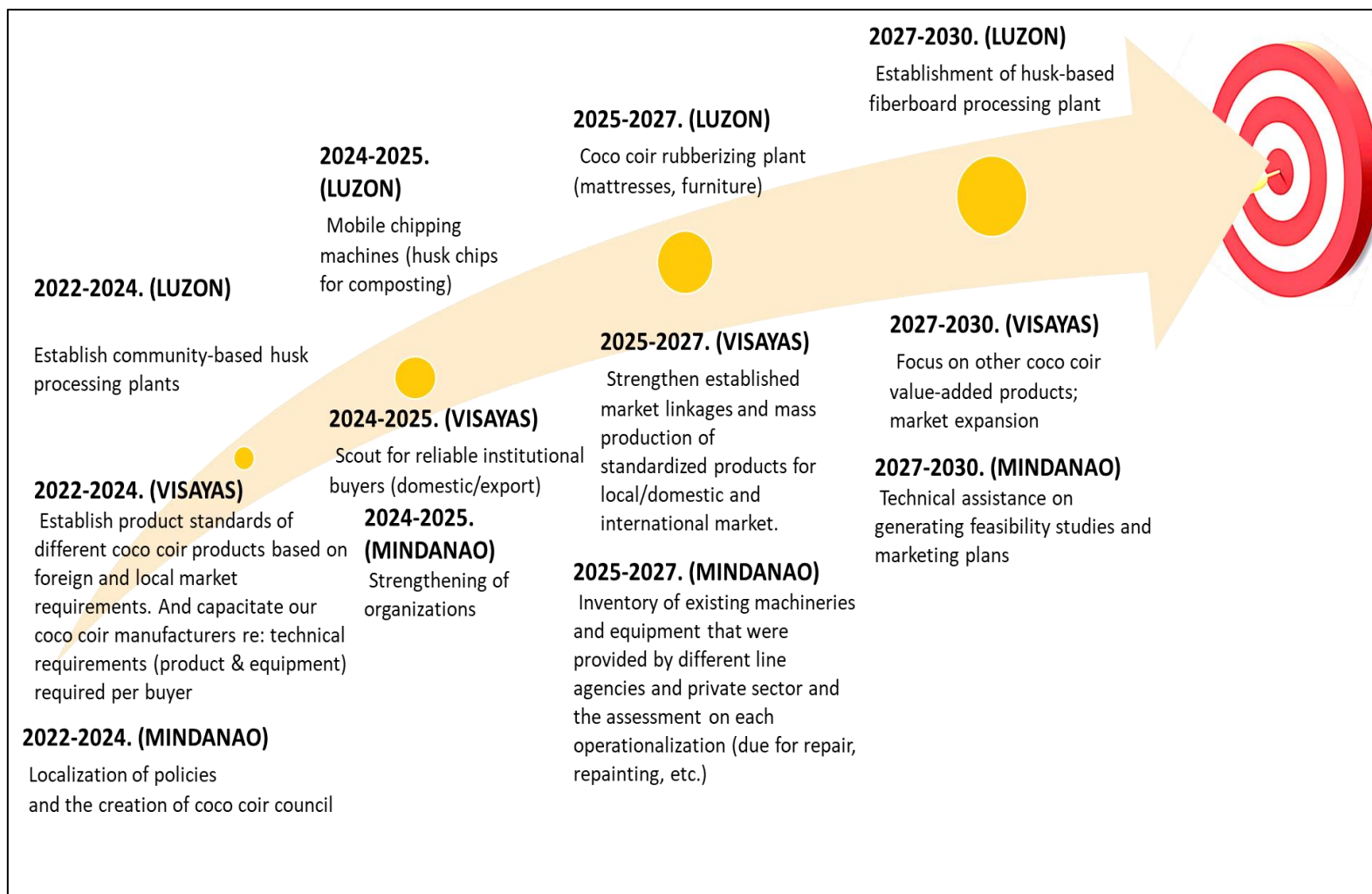


Figure 9. Coco Coir Roadmap (2022-2030)

3.2 VCO roadmap (2022-2030)

The PAPs for VCO are presented in Table 34. The target for 2022 is to process VCO using 1,200 kg-nuts per day utilizing the integrated wet process by fermentation among micro-scale processors. By 2023, the Visayas region targets micro-scale process VCO using 400kg-nuts per day and using the integrated wet process by cream/heating. By 2024, Luzon and Mindanao cluster regions would have started processing VCO using 400kg-nuts per day and using the integrated wet process by cream/heating among microprocessors. Following the targets for 2025 and 2026, micro processing of VCO would have commenced using 400kg-nuts/day, using the integrated wet process by freezing, in the Visayas cluster region, and Luzon, Mindanao cluster regions, respectively. The target for 2028 and 2029 would focus on the medium-scale process of utilizing 10,000 kg-nuts per day using the integrated wet process by fermentation for the Visayas and, Luzon, Mindanao regions, respectively. A schematic diagram of the VCO roadmap is shown in Figure 10.

By 2028, Visayas would have achieved VCO processing by the medium-scale processors using 600 kg-nut per day, using the integrated dry process by Desiccated Coconut (DCN) route. The target for 2030 is to process VCO by the medium-scale processors in Luzon and Mindanao cluster regions using 600 kg-nut per day, using the integrated dry process by DCN route.

Table 34. VCO Industry Programs and Projects

TARGET YEAR	LUZON	VISAYAS	MINDANAO
2022	Harmonize government programs and project support to the VCO industry. Improve the VCO industry's control and execution of government initiatives and projects.		
	Capacity Building for MSME VCO value chain operators		
2023	Production and processing capacities levelled up through appropriate equipment acquisitions or upgrades. Standardized processing of VCO for domestic and export markets		
2024	MICRO-SCALE Integrated wet process, fermentation, 1200kg-nuts/day	MICRO-SCALE Integrated wet process, fermentation, 1200kg-nuts/day	MICRO-SCALE Integrated wet process, fermentation, 1200kg-nuts/day

Table 34. Continuation...

TARGET YEAR	LUZON	VISAYAS	MINDANAO
2025	Capacity Building for MSME VCO value chain operators Production and processing capacities leveled up through appropriate equipment acquisitions or upgrades. Standardized processing of VCO for domestic and export markets		
2026		MICRO-SCALE Integrated wet process, cream/heating, 400kg-nuts/day	
2027	MICRO-SCALE Integrated wet process, cream/heating, 400kg-nuts/day		MICRO-SCALE Integrated wet process, cream/heating, 400kg-nuts/day
2028	Capacity Building for MSME VCO value chain operators Production and processing capacities leveled up through appropriate equipment acquisitions or upgrades. Standardized processing of VCO for domestic and export markets		
		MICRO-SCALE Integrated wet process, freezing, 400kg-nuts/day	
	MICRO-SCALE Integrated wet process, freezing, 400kg-nuts/day		MICRO-SCALE Integrated wet process, freezing, 400kg-nuts/day
2029	Capacity Building for MSME VCO value chain operators Production and processing capacities leveled up through appropriate equipment acquisitions or upgrades. Standardized processing of VCO for domestic and export markets		
		MEDIUM-SCALE Integrated wet process, fermentation, 10,000kg-nuts/day	
	MEDIUM-SCALE Integrated wet process, fermentation, 10,000kg-nuts/day	MEDIUM-SCALE Integrated dry process via DCN 600 kg-nut/day	MEDIUM-SCALE Integrated wet process, fermentation, 10,000kg-nuts/day
2030	MEDIUM-SCALE Integrated dry process via DCN 600 kg-nut/day		MEDIUM-SCALE Integrated dry process via DCN 600 kg-nut/day

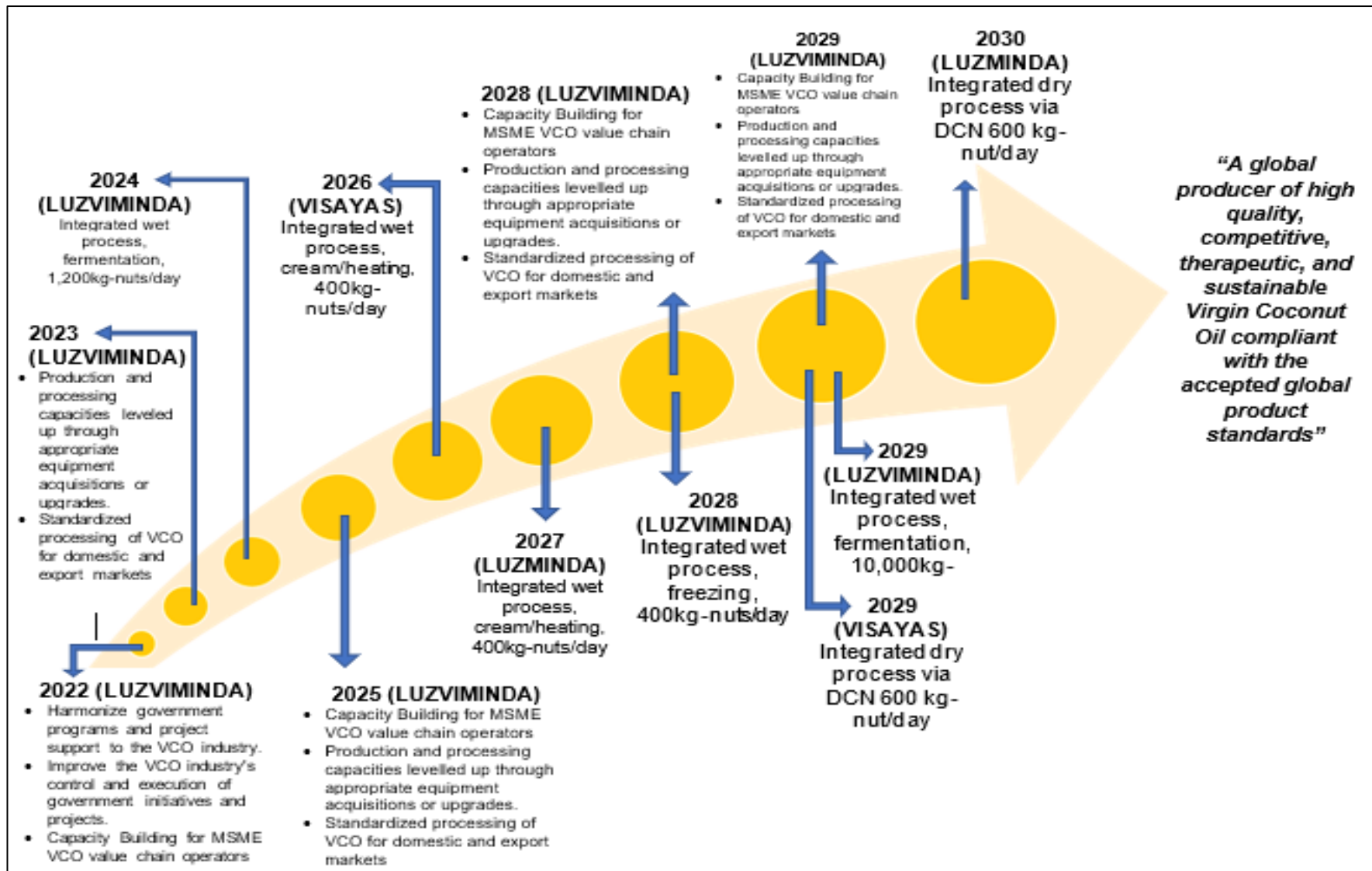


Figure 10. VCO Roadmap (2022-2030)

3.3 Coco sugar roadmap (2022-2030)

The PAPs for coco sugar to support the efficient operationalization and sustained developments are presented below. The immediate target for 2022 to 2024 across all clusters is to (1) strengthen the production and processing sector, (2) sustain capacity development programs (both social and technical skills), and (3) program for market research and development, commercialization, and growth, in line with the desired future for the coco sugar industry. A schematic diagram of the coco sugar roadmap is shown in Figure 11.

For the Luzon cluster, urgent PAPs specified large-scale planting of hybrid and dwarf coconut cultivars for sap production; village-level coconut processing should be established to boost output. The construction of coconut-based agricultural enterprises, trade posts, and coco hubs could also help. Intensive education, training, and skills-building programs to help farmers, sap collectors, and MSMEs were also recommended to maintain capacity growth.

Securing certificates, compliances, and accreditations to reach the worldwide market, such as Halal, Organic, Fair-Trade Cert., and others, are among the mid-term aims for the Visayas cluster, spanning the years 2025-2028. On the other hand, long-term PAPs include infrastructure and development projects such as the rehabilitation and concretization of Farm to Market Roads (FMRs) between 2028 and 2030.

While Mindanao is exacting on substantial marketing and promotional initiatives (such as exhibits and connections with trade attachés in many countries) (at least two meetings per year), it was suggested that clinical trials on the health advantages of coco sweeteners be conducted. In addition, successful renewable energy technologies (e.g., efficient cooking technology) are evaluated and benchmarked for cost efficiency and efficacy with a target date of 2024.

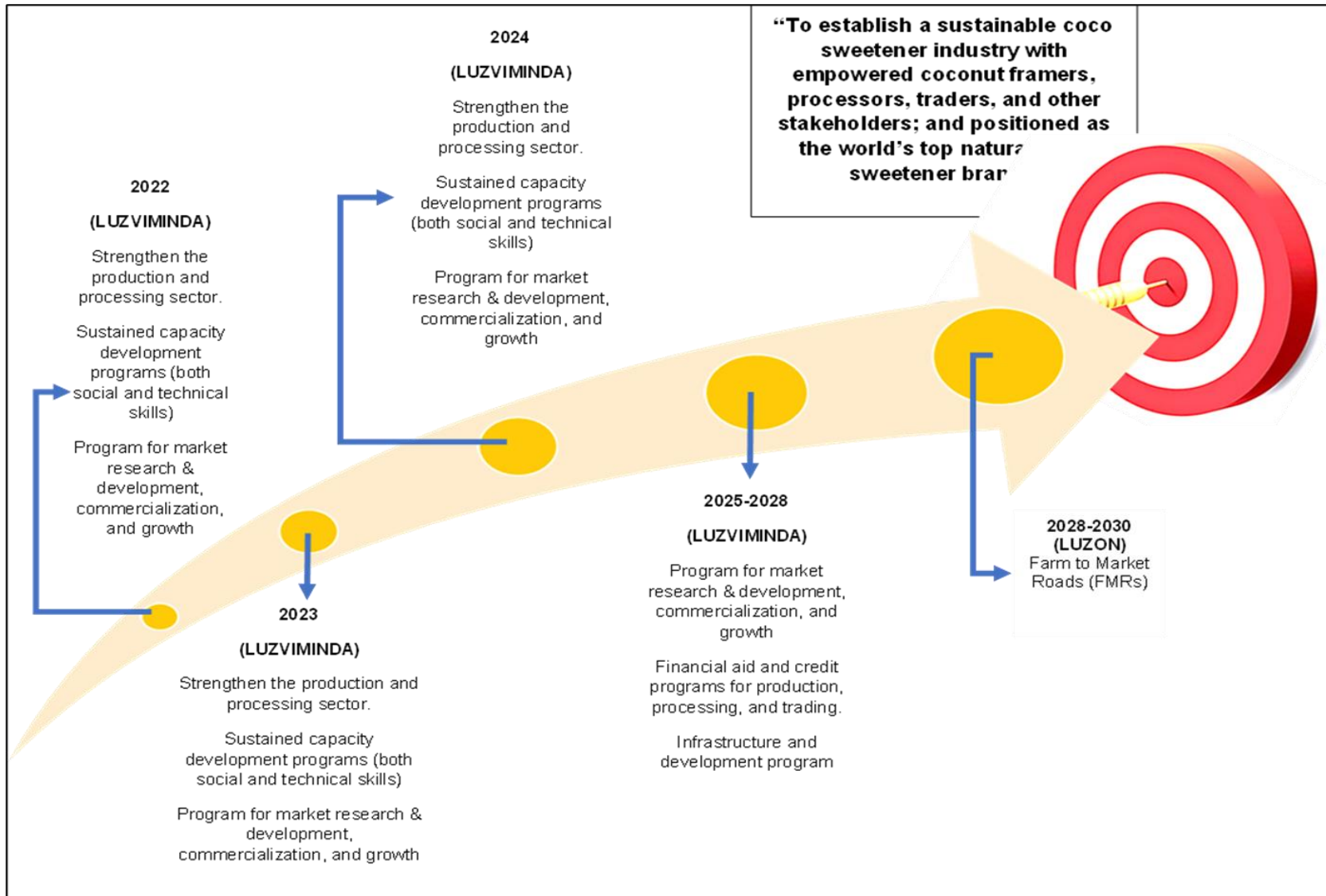


Figure 11. Coco Sugar Roadmap (2022-2030)

4 RECOMMENDATIONS

In consideration of the results presented and discussed in the previous chapters, of the various analyses were done by the country's industry stakeholders about the various aspects of their industry as a whole and its value chain's functional parts, this chapter reflects and advances the significant national strategic recommendations that the body has adopted and agreed upon as the industry's primary agenda for action in this 2022 PH Coconut Industry Roadmap 22-28 at the concluding session of the 2022 Coconut Industry Roadmap Focused Group Discussion.

4.1 Coco Coir

The following national-level recommendations are hereby advanced in response to the five major structural constraints facing the coco coir industry today.

Recommendation 1

Strengthen Value Chain operators' linkages and cooperation

Strategy 1. Establish regional and national coir industry council to represent the industry in negotiations and development planning.

Strategy 2. Orient farmers' organizations on RA 10048, RA 11524, and other government programs and policies.

Strategy 3. Capacity building on market negotiation and participation of SMEs in international trade fairs and exhibits.

Strategy 4. Enhance competitiveness through efficient production and applying advanced processing technology.

Strategy 5. Establish community-based integrated coconut husk processing and coco-peat-based bio-organic fertilizer production as a local consolidator and BIG BROTHER of the small coir processing in the area.

Recommendation 2

Establish husk consolidation canters (clustering) at the barangay and municipal levels

Strategy 1. Research to improve processing efficiency.

Strategy 2. Establish professionally managed husk consolidation/processing centers (clustering) at the barangay and municipal levels.

Strategy 3. Conduct massive information campaign on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.).

Strategy 4. Sustain industry growth, driven by expanding the product range.

Strategy 5. Develop programs and strategies to improve the price competitiveness of the Philippine coir

Strategy 6. Formulation of Industry Standards (e.g., Bioengineering Application Protocols; Creation of Monitoring Teams; Monitoring of Standards Compliance; and Capacity Building for Monitoring Team Members and key industry players.

Strategy 7. Conduct massive information campaign on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.).

Recommendation 3

Increase market share in existing, new, and stable markets.

Strategy 1. Invite youth groups to participate in the Orientation and information drive.

Strategy 2. Conduct massive information campaign on coir industry-related concerns (e.g., uses, existing standards, policies, market demands, available technologies, market promotion, financing windows, government programs, etc.).

Strategy 3. Promotion and advertising on digital and traditional platforms to create interest and increase demand for the coconut industry's economic advantage.

Strategy 4. Market facilitation, linkage, and matching to increase market access and promotion (domestic and export) within the value chain; should focus on direct trading of farmers' organizations/cooperatives to coconut processing companies and institutional buyers.

Strategy 5. Continuous market research by PCA and DTI-BETP on the market trends and uses of new products from coco coir, fiber, products, and peat and the potential markets for coir.

Strategy 6. Promotion and advertising on digital and traditional platforms to create interest and increase demand for the coconut industry's economic advantage.

Recommendation 4

Enhance Enablers' complementary actions towards a common goal and impact

Strategy 1. Formulation of continuity/sustainability plans.

Strategy 2. Crafting, issuing, and implementing a policy promoting continuous industry development through product development and innovation, research and development, and other relevant measures.

Strategy 3. Tap COCO LEVY FUND for shared service facilities, financing programs, and other government programs to expand capacities and improve the machinery of coir processing plants.

Strategy 4. Support zero farm waste program and coco peat-based organic fertilizer production as an enterprise.

Strategy 5. Strengthened implementation of the existing laws and policies on the use of coir for erosion control and coco peat for soil amelioration/medium for crop production and hydroponics system.

Strategy 6. Implement the provision of the agriculture and fisheries modernization act mandating the inclusion of Agri-related processes and activities/programs in high school and college curricula.

Strategy 7. Institutionalization of the Utilization of Coco peat in Fertilization and Food Security Programs.

4.2 VCO

The following are the national-level recommendations for the VCO Industry.

Recommendation 1

Improve the efficiency and execution of government support services and programs

Strategy 1. Harmonize government programs and project support to the VCO industry.

Strategy 2. Improve the VCO industry's control and execution of government initiatives and projects.

Recommendation 2

Advance the competitiveness of MSME VCO processing.

Strategy 1. Capacity Building for MSME VCO value chain operators.

Strategy 2. Improvement of MSMEs' production and processing capacities through appropriate equipment acquisitions and upgrades.

Recommendation 3

Improve the global market quality standards of VCO.

Strategy 1. Standardized processing of VCO for domestic and export markets.

4.3 Coco sugar

The following national-level recommendations are presented in response to the structural restrictions and outlook affecting the coco sugar industry.

Recommendation 1:

Strengthen the collaboration, linkages, and network of operators in the coco sugar value chain and their network and collaboration

Strategy 1. To coordinate the development activities of three independent clusters and develop and operationalize the coco sugar business.

Strategy 2. At the subnational level, institutionalize collaborations among coco sugar value chain players.

Strategy 3. Harness and/or increase the involvement of LGUs, academe, and stakeholders in different coco sugar sector development efforts.

Strategy 4. Sustained capacity-building initiatives for coco sugar value chain operators.

Recommendation 2

Improved competitiveness and efficiency in production (farm) and processing (firm)

Strategy 1. Support the coco sugar value chain actors by developing skills, technology, organization, and resources.

Strategy 2. Increase the adoption and use of excellent agricultural and industrial practices and the implementation of standard work techniques to assure and promote consistent and competitive quality.

Strategy 3. Increase production and processing capacity by purchasing and upgrading relevant equipment.

Strategy 4 Sourcing raw materials will help keep manufacturing costs down while maintaining excellent quality.

5 APPENDICES

5.1 Coco Coir- Validated SWOT Matrix per cluster

This section presents the coco coir swot matrix based on the validated SWOT discussion. In addition, to validate the SWOT offered in the Coconut Farmers and Industry Roadmap (COCOFIRM), three (3) virtual Focus Group Discussions (FGD) were performed concurrently. In three separate clusters: Luzon, Visayas, and Mindanao, different stakeholders, government agencies, academies, and processors participated in the FGD.

All regions are fortunate to have the presence of abundant raw materials, making it an industry that can produce coir products in bulk to fully satisfy the demands of local markets- or even abroad. However, the inefficiency of the capacity of producers to meet production standard requirements can hinder the industry's performance since they lack the proper machinery to produce products with the correct standards for the market, resulting in the variability of the quality of coco coir twine and peat. Despite the abundant materials, coconut husks still have low commercial utilization - only 8% are commercially utilized. There is a growing demand for eco-friendly products in international markets, being a green and inclusive industry, making it an opportunity for the Philippine coco coir industry to expand to global markets. Coco coir enterprise is an opportunity for coconut farmers and investors due to the growing demand for eco-friendly products in the market. Coir is a lightweight, soilless growing medium made from the fibres found between a ripe coconut shell and an outer surface. Therefore, its material is completely renewable and is considered an excellent choice for environmental sustainability. Government policies meant to support the coco coir industry are not strictly implemented, making it difficult for the industry to perform (See appendix

The Philippines has a lower comparative advantage in producing and exporting coco coir products than India and Sri Lanka. In 2019, India and Sri Lanka captured 94% of the global coco coir market. India has larger mechanized coir processing plants with economies of scale and has lower coir processing costs. For coir and coir products, the Philippines should ride on the global trend of going green and promoting sustainable and environmentally friendly products. The following items are the industry's Strengths, Weaknesses, Opportunities, and Threats.

Appendix A. Coco Coir Industry SWOT Analysis

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> ● Presence of abundant raw materials scattered all over the Philippines ● Organized coconut growers who supply husks to coir/peat processors ● Coconut farmers, rural community families, and workers earn additional income from selling husks ● Increasing domestic sales and export earnings from USD 661 thousand in 2009 to USD 3.9 million in 2019 ● Coco coir can be used as raw material to produce many secondary processed products/value-added products ● Coir processing facilities are available throughout the country through private initiatives and government-funded projects. ● Being a green and inclusive industry 	<ul style="list-style-type: none"> ● The inefficient capacity of producers to meet the product standard requirement of the market ● Variability in the quality of coco coir twine/peat ● Difficulty in consolidating coco coir from small, fragmented, and sometimes difficult to access coconut farms, high inbound logistics cost ● High inter-island transport cost ● Lack of market research on more value-added coir products ● Philippine coco coir/peat products are less price competitive in the export market compared to India and Sri Lanka ● Small capacity of coir processing plants; hence, production of coir products is not sufficient to meet large orders ● Lack of information dissemination of PNS of coco coir and peat products ● Outdated technology for processing/Lack of modern equipment for core twining/weaving ● Ineffective implementation of determining the right location and correct scale/capacity of the processing facilities ● No organized coconut fiber entity can represent the industry ● Inefficient utilization of decorticating equipment/machine ● High processing cost (i.e., electricity and labor cost) compared with India ● High logistics cost in consolidating and transporting raw materials ● Very low commercial utilization of coconut husks – only 8% are commercially utilized from the 14 billion nuts annual production ● The government policies in support of the industry are not strictly implemented

Appendix A. Continuation...

OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ● RA 10068 Organic Agriculture Act recommends the utilization of cocopeat ● RA 11524: An Act Creating Coconut Farmers and Industry Trust Fund mandates the use of geonets/coconuts bioengineering for DPWH projects ● MEMO circular no. 25, by the office of the president: mandating all government instrumentalities to use cocopeat and geonets for erosion control for government projects. ● Increasing local demand for coco peat as a soil conditioner and growing medium in agriculture ● Sustained advocacy on “May Pera sa Bunot” ● Domestic market promotion program for the use of other coir products ● Market Research on the market trends and uses of other coco coir fiber and peat products ● Extensive market promotion program, including participation in international fairs and exhibits ● Commercialization of existing and efficient technology on value-adding of coco fiber and coco peat ● Existence of government to support the development of the coir industry ● Available financing window for the coco coir industry ● Growing demand in the international market for coco peat and coir products ● Availability of technologies and technical experts 	<ul style="list-style-type: none"> ● Occurrence of low pressure and heavy rains makes it difficult for farmers to dry coconut fiber/coco peat ● India and Sri Lanka are far ahead in terms of price and quality competitiveness of coir products ● The younger generation may not be enticed to engage in coco coir processing ● BIR tax regulations/Government processes that hinder the growth of the industry

5.2 Coco Sugar- Validated SWOT Matrix per cluster

This section presents the coco sugar situational analysis overview based on the validated SWOT discussion. Moreover, to validate the SWOT offered in the Coconut Farmers and Industry Roadmap (COCOFIRM), three (3) virtual Focus Group Discussions (FGD) were performed concurrently. In three separate clusters: Luzon, Visayas, and Mindanao, different stakeholders, government agencies, academies, and processors participated in the FGD.

STRENGTHS

Most of the COCOFIRM's strengths and capabilities were still relevant across clusters in the coco sugar sector (Appendix B). However, the number of coconut sugar processing plants must be updated, particularly in the Luzon and Mindanao clusters. In addition, rather than asserting that the Philippines is the world's largest producer of coconut sap sugar, the Philippine Coconut Authority or any other government agency should offer figures. The Philippine National Standard (PNS) confirms that the quality of Philippine coconut sugar is comparable to that of other countries (PNS). However, they also stated that PCA's support for the coconut industry, especially in Region XII, can still be improved because they have an enormous task and limited manpower.

Appendix B. Strength Factors of the coconut sugar industry

REGION	STRENGTH	COMMENT/ SUGGESTION <i>(From the FGD Participants)</i>
LUZON	<ol style="list-style-type: none"> 1. The Philippines is the world's top producer of coconut sap sugar 2. Philippine coconut sugar is quality competitive in the global market 3. 33 coconut sugar processing plants 4. PCA's active support for technology transfer and provision of processing facilities 5. The successful business model on the convergence of support services from local government and other 	#3. The no. of processing plants needs to be updated.
VISAYAS		STILL APLICABLE
MINDANAO		<p>#1. Not applicable. Some of the customers are not buying our products. Suggestion: (If possible, include statistics c/o PCA)</p> <p>#2. Confirmed by Philippine National Standard (PNS)</p> <p>#4. Not applicable. Inactive on the field, specific for Region XII.</p> <p>Ineffective MIS and technology transfer. Insufficient workforce for tasks and support</p>

	<p>government agencies, ex. Alabat model</p> <p>6. Coco sugar has a low glycemic index and is a healthy option compared to other sugar sources.</p>	<p>#5. Not applicable. Selective – Alabat model does not apply to the whole industry</p> <p>#6. FNIR and thesis UPLB confirmed a low glycerin index.</p> <p>Suggestion: Additional study on health benefits of coco sweetener. Coordination with EU or Australian laboratories for more reliable low glycerine index results.</p>
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(Source: Extracted from the COCOFIRM Road map and the validated FGD results)

WEAKNESSES

Across clusters, the weaknesses identified in COCOFIRM were nonetheless considered applicable to the coco sugar industry (Appendix C). On the other hand, the Mindanao cluster underscored the industry's following weaknesses. (1) Ineffective consolidation and a lack of assistance for small and individual farmers. (2) Coco sugar sweetener does not have enough promotional materials or a proper positioning. (3) Insufficient financial assistance, such as loans, from government agencies. (4) Small-scale processors have a limited amount of capital. (5) There is a lack of innovation and technology. (6) There is a lack of coordinated continuity and a lack of cooperation amongst agencies.

Appendix C. Weakness Factors of the Coconut sugar industry

REGION	WEAKNESSES	COMMENT/ SUGGESTION (From the FGD Participants)
LUZON	1. There is an insufficient supply of coconut seedlings of high-yielding dwarf varieties suited for coco sugar processing.	#3. Not observed in the Alabat model
VISAYAS	2. Lack of skilled coconut sap tappers and mechanical technology for sap collection.	#2. Catarman Agri-Processors Organization: The organization controls the prices, giving traders a commission. Alter Trade sources coco sap from South Cotabato; looking to venture into the Visayas.
	3. Traders and consolidators dictate prices due to limited access to market	
	4. Low domestic demand; higher prices, and lack of market promotions on its health benefits	#4. Low demand due to high prices.

REGION	WEAKNESSES	COMMENT/ SUGGESTION (From the FGD Participants)
	5. High labor costs in the country make coco sugar less price competitive in the global market 6. Few processors, low production volume, and lack of export quality assurance. 7. MSMEs cannot compete with existing brands regarding pricing, packaging, promotion, and distribution.	#8. Recommendations: High certification fees should be lowered. Renewal time and requirements should be reduced. #9. Catarman: Home-based processors partner with the organization to consolidate production.
MINDANAO	8. No standardization: varying production and processing technologies resulting in inconsistent quality; and adulteration by a few local processors may affect the good image of the Philippine coco sugar 9. Many existing micro-sugar sap processors have no permits, licenses, or certifications. 10. Due to limited capital, many existing micro-sugar sap processors have no permits, licenses, certifications (FDA and BFAD), or processing/ packaging facilities. 11. Most MSMEs lack awareness of Hazard Analysis and Critical Control Points (HACCP) or organic certification, and those who are aware still cannot afford certification fees. 12. Ineffective consolidation and limited support to individual and small farmers. 13. Limited capital of small-scale processors. 14. There is a weak synergy between agencies and a lack of coordinated continuity or governing bodies to regulate and consolidate the coco sweetener industry.	#1. Suggestion: we need to focus on dwarf varieties applicable to sloping areas. Ineffective consolidation and limited support to individual and small farmers. #4. Lacking promotional materials and positioning for coco sweetener. #5. Insufficient support from agencies in terms of financial aid, e.g., loans. Limited capital of small-scale processors. #7. Insufficient technology and innovations. The weak synergy between agencies and lack of coordinated continuity. #9. Varying production technologies result in inconsistent quality. #10. Lack of governing bodies to regulate and consolidate the coco sweetener industry. Insufficient market information systems: lack of access to the global market.

(Source: Extracted from the COCOFIRM Road map and the validated FGD results)

OPPORTUNITIES

The opportunities were also validated during the focus group discussion for the three island clusters. Similarly, the participants were able to identify additional opportunities. Inclusion of PCA's hybridization program; available skills training on coconut production and sap tapping by ATI, PCA, and academe (e.g., VSU); Convergence of support from government agencies and the private sector on coconut sugar production; Reduce production costs through technology innovation which the government can take part; Growing global market demand for Philippine coco sweeteners; Emerging market segment for wellness products, especially for diabetic individuals; Public-Private Partnership; and Opportunity to tap DTI and market information through Mintel (Appendix D).

Appendix D. Opportunities Factors of the Coconut sugar industry

REGION	OPPORTUNITIES	COMMENT/ SUGGESTION (From the FGD Participants)
LUZON	<ol style="list-style-type: none"> 1. PCA's Strategic Planting/ Replanting and Hybridization Program 2. Available skills training on coconut production and sap tapping by ATI, PCA, and academe (e.g., VSU) 3. Research to develop mechanized sap collection 4. Available models of CFOs and cooperatives direct links with market and distribution channels in Metro Manila and/or abroad 	<p>#1. PCA's Hybridization Program</p> <p>#2. Available skills training on coconut production and sap tapping by ATI, PCA, and academe (e.g., VSU)</p> <p>Availability of skilled individuals</p> <p>#6. Convergence of support from government agencies and the private sector on coconut sugar production. Add: PRDP</p> <p>#7. Add: DOLE</p>
VISAYAS	<ol style="list-style-type: none"> 5. Promising market outlook due to growing interest in the health benefits coco sap sugar consumption 6. DTI shared facilities assistance, DA-PRDP, DOST Set-up program, and PCA's KANIB enterprise development program, which extends assistance in processing facilities and equipment. 	<p>#1. PCA: concentrating on hybrid varieties included in the CFIDP.</p> <p>#2. Also included in PCA's program under Coconut Farmers and Industry Development Plan (CFIDP)</p>
MINDANAO	<ol style="list-style-type: none"> 7. Available technical assistance or training on GMP compliance and 	<p>#3. Reduce production costs through technology innovation which the government can take part in.</p> <p>#5. Growing global market demand for Philippine coco sweeteners.</p>

REGION	OPPORTUNITIES	COMMENT/ SUGGESTION (From the FGD Participants)
	financing support for SMEs from PCA, DTI, and DOST. 8. Public-Private Partnership- Opportunity to tap DTI and market information through Mintel.	The emerging-market segment for wellness products, especially for diabetic individuals. #7. Public-Private Partnership Opportunity to tap DTI and market information through Mintel.

(Source: Extracted from the COCOFIRM Road map and the validated FGD results)

THREATS

The participants validated the COCOFIRM's current threats during the FGD. They recognized the following other concerns: climatic changes (continuing extreme rainfall, typhoons, and drought), an infestation of coconut pests, and diseases that will reduce sap yield. A few local processors may jeopardize the good reputation of Philippine coco sugar (Appendix E). As a threat, a respondent from the Visayas cluster shared a one-off example where a few processors blended muscovado sugar with coco sugar to save money while also affecting the taste. Existing competitors also posted better packaging techniques and processing advances. When compared to international competition, Philippine coco sugar processors are at a disadvantage in terms of cost.

Appendix E. Threat Factors of the Coconut sugar industry

REGION	THREATS	COMMENT/ SUGGESTION (From the FGD Participants)
LUZON	1. Climatic changes (i.e., heavy rainfall, typhoons, and drought) 2. Indonesia is price and cost-competitive compared to the Philippines because of the former's lower labor cost.	#2. Continues heavy rainfall #5. Not experienced in region 4
VISAYAS	3. Thailand's coco sugar is more advantageous in terms of quality in the international market. 4. Adulteration by a few local processors may affect the good image of the Philippine coco sugar 5. MSMEs cannot compete with existing brands in terms of pricing. Packaging, promotion, and distribution.	#2. Heavy rains (Mitigation factors should be in place – making farmers more resilient and diversified for land use.) #3. In Indonesia, more sap is collected, and more frequency of collection results in less cost. Suggestion: Gov't, DOST, and the like should do more research; look for alternative production designs, such as using "pugon." #5. Few processors mixed muscovado sugar with coco sugar, reducing cost and altering the taste.

REGION	THREATS	COMMENT/ SUGGESTION <i>(From the FGD Participants)</i>
	<p>6. Increasing concerns about food safety led to stringent entry requirements enforced by institutional buyers.</p> <p>7. Infestation of pests and diseases of coconut will affect sap yield.</p>	<p>#6. The Philippines has quality products, but Thailand presents its products as innovative, e.g., packaging, branding, etc.</p>
MINDANAO		<p>Infestation of pests and diseases of coconut will affect sap yield.</p>

(Source: Extracted from the COCOFIRM Road map and the validated FGD results)

Appendix F. Validated SWOT Matix of Coconut sugar industry

STRENGTH	OPPORTUNITIES
<ol style="list-style-type: none"> 1. The Philippines is the world's top producer of coconut sap sugar 2. 33 coconut sugar processing plants 3. Philippine coconut sugar is quality competitive in the global market 4. PCA's active support for technology transfer and provision of processing facilities. 5. The successful business model on the convergence of support services from local government and other government agencies, ex. Alabat model 6. Coco sugar has a low glycemic index and is a healthy option compared to other sugar sources. 	<ol style="list-style-type: none"> 1. PCA's Strategic Planting/ Replanting and Hybridization Program 2. Available skills training on coconut production and sap tapping by ATI, PCA, and academe (e.g., VSU) 3. Research to develop mechanized sap collection 4. Available models of CFOs and cooperatives direct links with market and distribution channels in Metro Manila and/or abroad 5. Promising market outlook due to growing interest in the health benefits coco sap sugar consumption 6. DTI shared facilities assistance, DA-PRDP, DOST Set-up program, and PCA's KANIB enterprise development program, which extends assistance in processing facilities and equipment. 7. Available technical assistance or training on GMP compliance and financing support for SMEs from PCA, DTI, and DOST. 8. Public-Private Partnership- Opportunity to tap DTI and market information through Mintel.
WEAKNESSES	THREATS
<ol style="list-style-type: none"> 1. There is an insufficient supply of coconut seedlings of high-yielding dwarf varieties suited for coco sugar processing. 2. Lack of skilled coconut sap tappers and mechanical technology for sap collection 3. Traders and consolidators dictate prices due to limited access to market 4. Low domestic demand; higher prices, and lack of market promotions on its health benefits 5. High labor costs make coco sugar less price competitive in the global market. 6. MSMEs cannot compete with existing brands in terms of pricing. Packaging, promotion, and distribution. 7. No standardization: varying production and processing technologies result in inconsistent quality, and adulteration by a few local processors may affect the good image of the Philippine coco sugar. 8. Due to limited capital, many existing micro-sugar sap processors have no permits, licenses, certifications (FDA and BFAD), or processing/ packaging facilities. 9. Most MSMEs lack awareness of Hazard Analysis and Critical Control Points (HACCP) or organic certification, and those 	<ol style="list-style-type: none"> 1. Climatic changes (i.e., heavy rainfall, typhoons, and drought) 2. Infestation of pests and diseases of coconut will affect sap yield. 3. Indonesia is price and cost-competitive compared to the Philippines because of the former's lower labor cost. 4. Thailand's coco sugar is more advantageous in terms of quality in the international market. 5. Increasing concerns about food safety led to stringent entry requirements enforced by institutional buyers.

<p>who are aware still cannot afford the certification fees.</p> <p>10. Ineffective consolidation and limited support to individual and small farmers.</p> <p>11. There is a weak synergy between agencies and a lack of coordinated continuity or governing bodies to regulate and consolidate the coco sweetener industry precisely.</p>	
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