

# The Economic Effects of Coconut Product Exports in the Agricultural Sector of the Philippines

Aiken Beale A. Nuqui<sup>1</sup>, Hersheys Ann S. Solomon<sup>2</sup>, John Jeea G. Alcance<sup>3\*</sup>, Marie Antoinette L. Rosete<sup>4</sup>

<sup>1,2,3</sup>Undergraduate Student, College of Commerce and Business Administration, University of Santo Tomas, Manila, Philippines

<sup>4</sup>Research Coordinator, College of Commerce and Business Administration, University of Santo Tomas, Manila, Philippines

**Abstract:** The coconut industry is one of the most important sectors of the economy of the Philippines. Coconut goods are the Philippines' most significant agricultural export. However, the international exports and competitive advantage could be improved, according to the Coconut Farmers and Industry Roadmap (COCOFIRM). This research paper provides a synopsis of the volume of coconuts and its value-added product in the Philippines including export values of traditional and non-traditional coconut products. This study examines the connection between the dependent variable and independent variables by the application of the Multiple Regression. Moreover, this research aims to evaluate the economic effects of exporting Coconut Products, Production Value of Coconuts, Foreign Direct Investment Inflows, Price of Coconuts, Agricultural Expenditures along with the objective of assessing the impact of the exports of the coconut products in the Philippines. The annual data from 1991 to 2020 helps to obtain results and use for further interpretation using regression analysis.

**Keywords:** Philippines, coconut, value-added, agricultural sector, export, foreign direct investment, agricultural expenditures, roadmap.

## 1. Introduction

The coconut palm (*Cocos nucifera*) is a tropical tree that was originally the first significant estate crop, spanning enormous uniform areas but is currently primarily produced and collected by small farmers. It is a fiber crop, as well as a food and beverage crop, in producing vegetable oil for industrial uses ranging from cosmetics and to biofuels and health and wellness goods (Ahuja, S. et al., 2014). Coconut is one of the Philippines' most important crops, and the Philippines is the world's second largest producer. (Seriño, M. et al., 2021). It is commonly planted in the Philippines, particularly in the highlands, but it favors sandy soils and is tolerant of saltwater conditions in coastal locations. After four to five years after planting, the coconut begins to bear fruit. Year-round production is common. Harvesting in the Philippines is usually done every three months or so. (Briones, R. and Israel D. 2014)

As coconut is regarded as one of the major vital agricultural commodities in the Philippines, there is a huge importance of farm income, land area allocated to coconuts, labor force employed, and foreign exchange earnings for this sector. It is one of the country's most vital agricultural crops as indicated by its considerable contribution to GDP. As the country's principal

agricultural export, it has played an important role in global competitiveness. (Aquino and Ani, 2016).

There are several reasons why coconut is and will continue to be the most important industrial tree crop in the Philippines. Only extremely strong wind can uproot and/or shatter coconut. The coconut loses some fruits and blooms as a result of the numerous typhoons that make landfall, but it recovers after a year or two. Furthermore, due to our archipelagic geography, coconut is well adapted to saline conditions in coastal locations, which we have enough of. (Javier E., 2015).

The Philippines is a significant manufacturer and a primary exporter of different exotic fruits, with the coconut industry being a dominant sector (Ceder, J. and Johannson, J., 2015). The coconut field and industry are a significant source of employment and extra monetary resources for many farmers in rural villages in emerging markets (Unctad, 2012). The providing farmers, who are the primary source of the coconut industry, frequently reside in rural regions remote from commercial centers. The most typical way for farmers to participate in the business network is by selling raw materials to multinational firms. Coconut production in the Philippines became industrialized in the early twentieth century. The providing farmers, who are the primary source of the coconut industry, frequently reside in rural regions remote from commercial centers. The most typical way for farmers to participate in the business network is by selling raw materials to multinational firms. (PCA, 2013). Coconut farming takes up nearly one-third of the landscapes of the Philippines. The industry controls a large portion of the country's agricultural economy. 3.4 million coconut farmers work in the sector. Coconut products have been exchanged in small amounts with Chinese and Malaysian traders in the Philippines since 1840. The Spaniards used coconut fibers and oil in the rigging of galleons and as food for sailors on the Manila-Acapulco galleon trade. The increased demand for copra and coconut oil laid the groundwork for the coconut manufacturing and export economy, which flourished during the Philippines' early golden years of industrialization.

Source: Department of Agriculture - Philippine Coconut Authority

The Philippine Coconut Authority has presented the Coconut Farmers and Industry Roadmap (COCOFIRM) from 2021 to 2040. COCOFIRM aims to provide direction and

\*Corresponding author: johnjeea.alcance.comm@ust.edu.ph

recommendations toward sustainable development of the coconut industry. In line with the primary objectives of COCOFIRM, this study would like to focus on the roadmap's take towards inclusive economic growth of the coconut industry to lift the coconut farmers out of poverty, improve their competitiveness, and expand the market potential of both traditional and non-traditional coconut products. The Coconut Farmers and Industry Roadmap (COCOFIRM) focuses on two key areas to help the coconut industry develop sustainably: 1) inclusive growth to help coconut farmers escape poverty; and 2) enhancing competitiveness and increasing the market potential for both traditional and non-traditional coconut products.

Following are the objectives of the study:

This research is made with the aim to provide a crucial information and knowledge regarding the chosen topic from the respondents, recent studies or theses, and related cited needed for the expected importance to the individuals as follow: The information provided in this study may help students understand how the agricultural sector functions with coconut exports in the Philippines as its primary focus. Students will benefit from this study as the economy plays a vital role towards our lifestyle. Understanding the importance of coconut exports is important especially in an agricultural country like the Philippines. In addition, this study will be beneficial to the future researchers to navigate the opportunities from exporting value-added coconut products that would provide a positive economic impact in the Philippines, fueled by the objectives of COCOFIRM. Through this research, future researchers may purposefully discover and learn about the impacts and economic effects of coconut exports in the agricultural sector of the Philippines. Ultimately, this study will be vital for the economic sector of the academe as this study would find the opportunities and impact if coconut would be one of the main export products of the Philippines.

How does the Coconut Products affect the Agricultural Sector in terms of:

- a. Traditional Coconut Products and Non-Traditional Coconut Products
  - i. Export Value of Dessicated Coconut
  - ii. Export Value of Coconut Oil
  - iii. Export Value of Copra Meal
  - iv. Export Value of Virgin Coconut Oil
  - v. Export Value of Coconut Milk
  - vi. Export Value of Coconut Water
- b. Traditional and Non-Traditional Coconut Product Exports
- c. Production Value of Coconuts
- d. Foreign Direct Investment Inflows
- e. Production Value of Coconut
- f. Price of Coconuts

This study focuses on presenting and providing relevant research in focus on the volume of value-added coconut products, trade and economic effects towards the Agricultural sector of the Philippines. This study provides a comprehensive review of the coconut supply chain development in the Philippines. However, this study does not provide extensive

empirical analysis of the value chains and the factors that affect the coconut product exports in the Philippines. Furthermore, this research would not focus on achieving the objectives of everything provided in the COCOFIRM. However, this research aims to add a supplement to develop touchpoints for the objectives of the COCOFIRM. Therefore, examining value-addition in the coconut supply chains would be an excellent opportunity for future research. Assessing the factors influencing the exports of coconut products from the Philippines is another avenue for further research.

The coconut industry is divided into two subsectors: traditional and non-traditional products. Coconut oil, a traditional product, accounts for 70% to 80% of all coconut product exports. On the other hand, non-traditional coconut products account for around 30% of overall exports but have substantial growth and market development possibilities. Traditional goods are increasingly being challenged by different forms of vegetable oils, specifically palm oil, which is an excellent alternative to coconut oil. In addition, non-traditional coconut products need further expansion to attain a more outstanding contribution to the coconut industry. Currently, copra prices have plummeted, prompting concern in the coconut sector and government intervention to support the industry. (Costales, 2020)

Additionally, coconut oil is a tropical oil that is extensively used throughout Asia, including the Philippines. It is made from the dried coconut kernel or flesh, also known as copra. (Shankar *et al.*, 2013). The coconut oil supply chain is distributed, especially upstream, where millions of smallholders sell copra, the flesh from which coconut oil is extracted, as well as thousands of mediators. (Andriessse, 2019) According to Mondal and Prassana Kumar (2016), desiccated coconut is a dehydrated shredded flesh and dehydrated kernel of mature coconuts made from fresh ripe coconuts. Arunlandoo *et al.*, (2017) explained that after removing the brown testa or pairings, desiccated coconut is the disintegrating and dehydrated coconut kernel or pulp, which mostly consists of the white section of the kernel. Fresh matured de shelled coconut kernels are required to manufacture desiccated coconut powder. In addition, Feedipedia stated that copra meal is an excellent feed for ruminants and can be used as a protein supplement for animals raised on grass, either alone or in conjunction with other protein sources. Additionally, the oil from dried coconut kernels is extracted using an expeller or a solvent to create copra meal. Coconut meal or coconut oil meal are other names for copra meal.

On the other hand, there are also non-traditional coconut goods available, such as coconut chemicals, foods, and non-food items. Fresh coconuts, grated coconut flesh, grated coconut flour, nata de coco, coconut water, coconut milk powder, liquid coconut milk, macapuno, frozen coconut meat, coconut chips, and coco jam are some of the non-traditional coconut food products exported by the Philippines (Philippine Coconut Industry, 2020). According to the Department of Trade and Industry (DTI), the top exporter of coconut oil is the Philippines, which lists coconut as one of the top agricultural export commodities for 2019. In 2020, the Philippines

continued to export the most coconut-related goods worldwide. Furthermore, coconut water is a traditional tropical beverage that has grown in popularity on the international market in recent years. Coconut water's quality is linked to so much more than carbohydrates and minerals; it also has a distinct flavor and some unique qualities. (Prades, et. al., 2011). Lastly, Patil and Benjakul stated in 2018 that coconut milk is a continuous oil-in-water emulsion. Water is the liquid phase, while oil is the dispersion phase. Coconut milk is the liquid recovered from shredded coconut white flesh, which is high in saturated fats and prevalent in areas of Asia and South America (Tinchán, et. al, 2015).

## 2. Review of Related Literature

This section will discuss relevant literature that is related to the study of Coconut Products in the Philippines. The presentation is in four sections. The first section gives the brief background of Coconut Roadmap followed by economic effects of coconut in the Philippines. Secondly, the agricultural exports of coconut. Lastly, the volume of Coconut value-added products in the agricultural sector. The case study is described in detail to provide an overview of the different variables concerned for this study.

### A. Philippine Coconut Authority's Coconut Farmers and Industry Roadmap

One of the primary issues in the export of coconut goods is the diminishing level of output, which has resulted in foreign, exporting countries failing to fulfill global demand. Coconut flourishes in warmer settings since it is a tropical crop. Furthermore, farmers cannot rely primarily on selling coconuts to attain food security and alleviate poverty. The farmers must diversify their sources of revenue. (Moreno, et. al, 2020)

Philippine Coconut Authority (2022) also suggested that amidst the backdrop of a struggling coconut industry, 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 advancements, including but not limited to: increasing awareness of the medical, therapeutic, and nutritional values of coconut products such as coconut water, VCO, and coconut flour.

Due to the influx of low-cost imported palm oil, canola oil, soybean oil, and corn oil, domestic use of coconut RBD oil as cooking oil remains low, as does usage of coconut oil as a raw material in oleochemical manufacturing. Domestic demand for VCO will continue high, particularly in light of the DOST's disclosure of the possible benefits of VCO on COVID-19 patients and the high likelihood of battling African Swine Flu. Because of its various applications, coir is projected to follow the same trend. However, due to the continued reliance on sugarcane-based sweeteners, which are cheaper, increase in local demand for coco sugar may be gradual. The same can be said for coconut water, as locals prefer to drink the water from fresh young nuts rather than packed ones. (Department of Agriculture - Philippine Coconut Authority).

According to FAOSTAT (2019), coconut exports produced a

total value of US\$ 1.83 billion annually from 2015 to 2019. This sum represented 2.86 percent of the country's merchandise export revenues. Traditional and non-traditional coconut products are included in the coconut export mix. Coconut oil contributed the most (70 percent), followed by desiccated coconut (15 percent) and copra meal (4 percent). Non-traditional coconut product exports, on the other hand, contributed to just 0.46 percent (US\$ 292 million) of overall foreign exchange revenues. Exports of traditional coconut products increased by an average of 5.1 percent from 2015 to 2019. However, non-traditional coconut product export revenues fell from \$315 million in 2015 to \$287 million in 2019, a 1% annual reduction.

Furthermore, total revenue from exports from traditional and non-traditional coconut products, on the other hand, increased at a 3.9 percent annual pace between 2015 and 2019. Copra cake, Coconut oil, and desiccated coconut are among the country's top ten agricultural export items. During 2015-2019, coconut product exports produced an aggregate value of US\$ 1.83 billion annually. This sum accounted for 2.86 percent of the country's merchandise export revenues in the same period. Coconut oil contributed the most (70 percent), followed by desiccated coconut (15 percent) and copra meal (4 percent). Total export earnings from traditional and non-traditional coconut products increased at a 3.9 percent annual pace.

### B. Economic Effects of the Coconut

Coconut flourishes in hot climates because it is a tropical crop. It is the Philippines' one of the largest employers of agricultural labor and land. Coconut's performance in the economy as a significant source of income has led to it being seen as a predictor of the country's overall economic activity. Moreover, coconut product exports are the country's primary source of foreign exchange. The Philippines' industry is composed of three sectors: trading, processing and production, all of which have strong interrelationships (Moreno, et al., 2020).

The Philippine coconut industry is one of the pillars of the national economy. Coconut product exports have consistently been a considerably major component of total Philippine exports. The greater bulk of this export is in the form. (The Philippine Coconut Industry: Status, Policies and Strategic Directions for Development, 2019). The Philippines Coconut Authority (PCA), a government organization charged with researching, planning, and developing policies, plans, and actions for the country's coconut business, creates a roadmap that provide innovative products made from coconuts, such as coconut oil, coconut husks made readily available for commercial use (Sagena, 2020). Coconut oil is one of the Philippines' most vital products in agricultural export, followed by desiccated coconuts and copra cake. (PCA, 2019).

Crops, animals, fisheries, and trees are all produced in agricultural systems for food, feed, clothing, and shelter. Changes in climate, technologies, institutional structures, the country's resource endowments, and the ecological services given by environment and natural resource systems all influence their productivity and sustainability. (Philippine

Agriculture, 2020)

H<sub>0</sub>: Economic Effects of the Coconut have no impact on the agricultural sector of the Philippines.

### *C. Gross Value Added and Agricultural Exports in the Philippines*

Jayadi and Aziz (2017) expressed that the Philippines are part of the countries with the biggest GDP nominal for its abundance of natural and human resources, alongside Malaysia, Indonesia, Vietnam, Thailand and Singapore. However, the Philippines, Malaysia and Indonesia have a comparative advantage in human capital-intensive industries (2017).

Crost and Felter (2019) stated that bananas are the Philippines' most significant export crop. The value of the country's banana exports in 2011 was 470 million US dollars, accounting for nearly 10% of the overall value of the country's agricultural exports. Between 2000 and 2013, production in the Philippines more than quadrupled, rising from 1.6 to 3.3 million metric tons. Chiquita, Dole, and Sumitomo dominate the export market, which is highly consolidated and dominated by a limited number of multinational export corporations. In addition, Davao Region, also known as Region XI, is located in the southeastern part of Mindanao. It covers an area of 2,035,742 hectares (ha). Davao accounted for 41.8 percent of total banana production and 19.4 percent of the total banana planted area in the country. Fresh bananas, which account for 40% of the region's total exports, remain its leading export, earning USD 223.2 million in 2010 (Banzon, et. al, 2013).

Muscovado sugar, fresh Cavendish bananas, banana chips, mango, coconut oil, and yellow corn are among the organic items that are being exported. These items are primarily exported to Japan, Korea, New Zealand, and Singapore (for bananas), and Austria, Germany, Malaysia, South Korea, Switzerland, and the United States (for muscovado sugar, Virgin coconut oil). (Salazar, 2013)

However, the Philippines trails behind its ASEAN neighbors in terms of export performance. From 2006 to 2013, Philippine exports expanded at a slower rate than its counterparts, rising at 4.6 percent each year, compared to 17.9 percent in Vietnam, 9 percent in Indonesia, and 9.2 percent in Thailand. One of the factors of export growth is a component of GDP called the Gross Value Added (GVA), is the value of output less the value of intermediate consumption. (Pacinabao, 2019). The Philippines' agricultural contribution to GDP fell from 21 percent in the preceding decades to less than 15 percent between 1990 and 2004. Moreover, in 2013, it continued to fall, falling to 10%. From 1992 to 2003, the Philippine annual growth rate in agriculture (value added) was 2.5 percent. Agriculture Gross Value Added (GVA) rose at a 2.05 percent yearly pace between 2011 and 2013. (Urrutia. et al., 2018).

Agriculture, industry, and services are the three basic sectors of an economy. Agriculture is one of the most significant sectors in eliminating poverty. Growth in agriculture has significantly lagged that of the other basic sectors (Briones, 2017). Because the Philippines is primarily an agricultural country, food loss and waste are becoming increasingly important to farmers and are seen as a threat to agricultural

sustainability and food security. (Mopera, 2016).

However, an increase in agricultural output can have long-term dynamic implications. Making it possible for farm households to invest in human capital will promote intergenerational diversity of sources of income. (Briones, 2013).

Over the next decade, agriculture will face several challenges, including supplying rising food demand with limited farmland and balancing the need to import with the provision of livelihoods. The role of agriculture in the Philippine economy has undergone dramatic changes. Agriculture's contribution to the Philippines' Gross Domestic Product (GDP) and exports is decreasing, in line with the country's move to middle-income status. (Briones, 2013).

H<sub>0</sub>: Gross Value Added and Agricultural Exports in the Philippines have no impact on the agricultural sector of the Philippines.

### *D. Volume of Traditional and Non-Traditional Coconut Products*

Traditional Coconut products are products that have been in the agricultural sector for a long time. These products have been a staple, with great demands, in households and copra meal, desiccated coconuts, coir products and are the traditional coconut products that are wide in Asian markets. (Hoe, 2018). According to Padua (2015) coconut oil is the most significant oil product in the Philippines, with an average household usage of one liter per week. At the same time, coconut oil is the most vital agricultural export product in the Philippines, accounting for 23% of total agricultural export value (i.e., USD 5 billion) in 2015. (PSA, 2018). In the first half of 2010, the Philippines was the world's top coconut oil exporter (Padua, 2015). According to the International Trade Centre Statistics (2012), the Philippines has been the world's leading coconut oil exporter for the past five years. Coconut oil is edible and has been consumed for thousands of years in tropical regions. World coconut oil exports have increased over the last decade, owing to increased global demand for coconut oil's major characteristics. (Pham, 2016). The Philippine Statistics reports that the average annual production of Coconut Oil for the period 1991-2020 was 28,637,890.00 tonnes. Desiccated Coconut is a pure white, pared, dehydrated, and shredded coconut meat prepared from the fresh kernel of the coconut, which is considered an excellent food product because of its superior quality. (Philippine Coconut Authority, 2020). The Philippine Statistics reports that the average annual production of Desiccated Coconut for the period 1991-2020 was 3, 102,046.00 tonnes. According to (Feedipedia n.d), copra meal is an excellent feed for ruminants and can be used as a protein supplement for animals raised on grass, either alone or in conjunction with other protein sources. Additionally, the oil from dried coconut kernels is extracted using an expeller or a solvent to create copra meal. Coconut meal or coconut oil meal are other names for copra meal. The Philippine Statistics reports that the average annual production of Copra Meal for the period 1991-2020 was 22,560 tonnes.

On the other hand, non-traditional coconut products have

entered global changes that were developed to expand the usage of the raw materials that consumers use in their everyday lives. (Prades, et. al, 2016) These products have grown in the Philippine market, and the most notable developments in the market are virgin coconut milk, coconut oil, and coconut water. (Hoe, 2018). According to the Department of Trade and Industry (DTI), the Philippines is the world's top coconut oil exporter, which lists coconut as one of the top agricultural export commodities for 2019. In 2020, the Philippines continued to export the most coconut-related goods worldwide. The Philippine Statistics reports that the average annual production of Virgin Coconut Oil for the period 1991-2020 was 479,271.88 tonnes. In addition, Coconut milk is the liquid recovered from shredded coconut white flesh, which is high in saturated fats and prevalent in areas of Asia and South America (Tinchan, et. al, 2015). It is also common in tropical areas throughout the world. (Britannica) The Philippine Statistics Authority reports that the average annual production of Coconut Milk (Liquid Form) for the period 1991-2020 was 96,324.49 tonnes. Lastly, Coconut water is a traditional tropical beverage that has grown in popularity on the international market in recent years. Coconut water's quality is linked to so much more than carbohydrates and minerals; it also has a distinct flavor and some unique qualities. (Prades, et. al., 2011). The Philippine Statistics Authority reports that the average annual production of Coconut Water for the period 1991-2020 was 19,402,368.47 tonnes.

H<sub>0</sub>: Volume of Traditional and Non-Traditional Coconut Product Exports have no impact on the agricultural sector of the Philippines.

#### E. Foreign Direct Investments

Foreign Direct Investments (FDI) is an unusual movement of globalization that is a vital source of gaining efficient productivity and finances in economies as this promotes economic growth, better technology, and more investments., especially in industrial and developing nations (Roy, 2012). Supposedly, trade has an impact on economic growth.

Recent years have seen a significant increase in the use of foreign direct investment (FDI) as a source of capital, particularly in the markets of emerging nations. FDI, in general, refers to net investment made by a foreign investor to purchase a long-term management interest in a local corporate organization. The cash and experience that multinational corporations have to offer to develop sales abroad make this global strategy essential for emerging market nations. Aside from providing developing countries with more resources for investment and capital formation, FDI also provides a channel for the transfer of advanced managerial techniques, production technology, skills, and know-how, as well as the creation of global marketing networks. As a result, emerging nations, the Philippines included, are progressively formulating the best strategic policies towards FDI. (Paet and You, 2018)

H<sub>0</sub>: Foreign Direct Investments have no impact on the agricultural sector of the Philippines.

#### F. Coconut Production and Pricing in the Philippines

The Philippines is the world's second-largest producer and exporter of coconut (Gurbinz, I., and Manaros, M. 2019). According to the Philippine Coconut Authority (PCA), 68 of the country's 81 provinces are coconut regions, with 3.517 million hectares planted for coconut, accounting for around 26 percent of agricultural land and generating 14.902 billion nuts each year. There are various products from coconuts that are being produced and sold in the market such as coconut oil, copra meal, desiccated coconut (Hoe, 2018). Regardless of the Philippines being a primary trade product in the Philippines, the production of coconut could be more competitive. Hence, farmers are not motivated to continue to produce coconuts. As a result, during the last decade, coconut output has decreased. To increase the production and exports of coconut products, scientists and policymakers need to conduct an extensive evaluation of the current state of coconut production and supply chains in the Philippines, as well as an assessment of the barriers to increase the production of coconuts. Because coconut's success in the economy is the main source of revenue, it is seen as a predictor of the country's overall activity of the economy. (Kuwarnu, et. al, 2020). With the production of coconuts that are rampant in the Philippines comes the pricing of coconut products. A study conducted by Doloriel, Ronquillio and Estal in 2013 suggest that with the influence of substitution and competition, the coconut industry suffered from the low copra prices, especially on farmers who are dependent on producing coconut and its subsidiary products. With the abundance of coconuts in the Philippines, the industry suffers from low productivity outputs with a surplus of supplies as cheaper alternatives, such as palm oil, are abundant in the market.

H<sub>0</sub>: Coconut Production and Pricing have no impact on the agricultural sector of the Philippines.

#### G. Synthesis

The Philippines is the world's second largest producer of coconut products, after Indonesia. As a result, one of the most vital sources of employment in the Philippines is the coconut industry. Because of increased global demand, coconut-based products have seen strong global export growth. However, with competition arising with cheaper alternatives, coconut products face a lack of competitive advantage. Coconut oil and desiccated coconut are two most common Philippine coconut products (Philippine Coconut Industry Statistics, 2022). On the other hand, non-traditional coconut products have entered global changes that were developed to expand the usage of the raw materials that consumers use in their everyday lives. (Prades, et. al, 2016). In addition, agriculture, industry, and services are the three basic sectors of an economy. Moreover, agricultural development goes beyond improving basic crop productivity to include the agribusiness value chain and rural services, and is based on comparative advantage (Briones, 2013). The Philippine government considers that the agricultural sector, which produces the majority of the country's food needs, is critical to ensuring food security (Tiongco & Francisco, 2011). Recent years have seen a significant increase

in the use of foreign direct investment (FDI) as a source of capital, particularly in the markets of emerging nations. (Paet and You, 2018). The study focused on four independent variables (Price of Coconuts, Foreign Direct Investment Inflows, Production Value of Coconuts, Traditional and Non-traditional Coconut Product Exports) to see the significance to the economic effect of coconut production in the agricultural sector in the Philippines

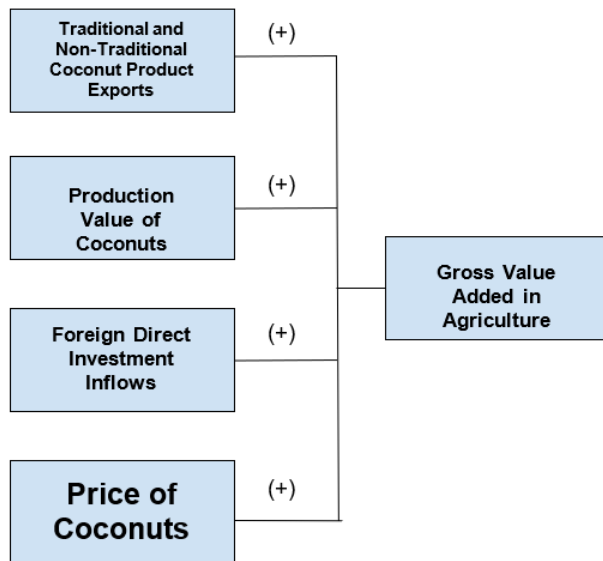


Fig. 1. Simulacrum

### 3. Research Method

#### A. Research Design

The study made use of a multiple regression research design. The method took into account the independent variables of export values of coconut milk (liquid form), coconut oil, and desiccated coconut towards the agricultural sector and their essential correlations with the dependent variable, the economic effects of coconut value-added products in the agricultural sector of the Philippines. Using this method, the study assessed if the independent factors impact or imply specific changes in the dependent variable. The study employed Multiple Regression, a known measurement tool identifying economic growth.

#### B. Data and Sources

The study used data from the Food and Agriculture Organization Corporate Statistical Database (FAOSTAT) and Philippine Statistics Authority (PSA). The research includes the all of annual time-series data from Philippine Coconut Industry's Volume of Traditional and Non-Traditional Coconut Product Exports from 1991 until 2020 as well as the Philippines Production Value of Coconuts, Prices of Coconuts, Foreign Direct Investment Inflows and the Gross Value Added in Agriculture of the Philippines.

#### C. Research Model

$$GVAA = \beta_0 + \beta_1 \text{Traditional and Non - Traditional Coconut Product Exports} + \beta_2 \text{Production Value of Coconuts} + \beta_3 \text{Foreign Direct Investment Inflows} + \beta_4 \text{Price of Coconuts} + \mu$$

Specifically, this study adapted the multiple regression model by Salvacion where Y is the Gross Value added in Agriculture, X is Traditional and Non-Traditional Coconut Product Exports, Production Value of Coconuts, Foreign Direct Investment Inflows, Price of Coconuts, and an error term.

The model above was adopted from Sertelis' (1992) study entitled "Export growth and Canadian economic development" using the Multiple Regression model. In this study, multiple regression analysis was performed to identify and analyze the relationship between the dependent variable (Gross Value added in Agriculture) and independent variable indicators (Traditional and Non-Traditional Coconut Product Exports, Production Value of Coconuts, Foreign Direct Investment Inflows, Production Value of Coconut, and Price of Coconuts). Through a multiple regression equation, the coefficients described the correlation between the dependent variable and independent variables, which allowed the researchers to determine the strength of the outcome and each predictor variable and the significant impact of each predictor on the dependent variable.

### 4. Result and Discussion

This research aims to supplement the COCOFIRM's objectives by developing touch points as well as navigating the opportunities from exporting value-added coconut products, which will have a positive economic impact in the Philippines and will be fueled by COCOFIRM's objectives. Understanding the importance of coconut exports is critical, especially in an agricultural country like the Philippines.

This research uses the multiple regression method in order to assess the relationship of the traditional and non-traditional coconut products and its effect to the country's economy with the Gross Value Added in Agriculture in the Philippines. The variables include the total number of traditional and non-traditional coconut products, price of coconuts, foreign direct investment inflows, production value of coconuts. Moreover, the data used were annual time-series data from 1991-2020 from Food and Agriculture Organization Corporate Statistical Database (FAOSTAT) and the Philippine Statistics Authority (PSA). The data gathered were placed in a statistical application entitled 'gretl' to identify the least ordinary squares and multiple regression.

$$GVAA = \beta_0 + \beta_1 \text{Traditional and Non-Traditional Coconut Product Exports} + \beta_2 \text{Production Value of Coconuts} + \beta_3 \text{Foreign Direct Investment Inflows} + \beta_4 \text{Price of Coconuts} + \mu$$

Using the Ordinary Least Squares, Table 1 shows that the two independent variables which are the price of coconuts and production value of coconuts are insignificant to the Gross Value Added in Agriculture. Traditional and Non-Traditional Coconut Products and Agricultural Expenditures had negative effects on Gross Value added in Agriculture. Foreign Direct Investment Inflows are statistically significant and wielded positive effects respectively on Gross Value Added in Agriculture.



Table 1  
Regression Results (OLS)

Model 1: OLS, using observations 1991-2020 (T = 30)				
Dependent Variable: Gross Value Added in Agriculture				
	Coefficient	Std. Error	t-ratio	p-value
const	61861.8	26679.3	2.319	0.0292 **
Traditional and Non Traditional Coconut Products	-0.0100978	0.00165147	-6.114	<0.0001 ***
Production Value of Coconuts	0.000307054	0.0415422	0.007391	0.9942
Foreign Direct Investment Inflows	47.0589	19.8486	2.371	0.0261 **
Price of Coconuts	1197.75	1092.45	1.096	0.2838
Agricultural Expenditures	-3.69943	1.42442	-2.597	0.0158 **
Mean dependent variable	54232.57	S.D. dependent var	201371.5	
Sum squared resid	3.86E+11	S.E. of regression	126791.5	
R-squared	0.671907	Adjusted R-squared	0.603554	
F(5, 24)	9.829989	P-value(F)	0.000033	
Log-likelihood	-391.7300	Akaike criterion	795.46	
Schwarz criterion	803.8671	Hannan-Quinn	798.1495	
rho	0.160335	Durbin-Watson	1.659581	

Dependent Variable: Gross Value Added in Agriculture  
Sample: 1991-2020

Table 2

Model 1: OLS, using observations 1991-2020 (T = 30)				
Dependent Variable: Gross Value Added in Agriculture				
	Coefficient	Std. Error	t-ratio	p-value
const	61861.8	26679.3	2.319	0.0292 **
Traditional and Non Traditional Coconut Products	-0.0100978	0.00165147	-6.114	<0.0001 ***
Foreign Direct Investment Inflows	47.0589	19.8486	2.371	0.0261 **
Agricultural Expenditures	-3.69943	1.42442	-2.597	0.0158 **
Mean dependent variable	54232.57	S.D. dependent v	201371.5	
Sum squared resid	3.86E+11	S.E. of regression	126791.5	
R-squared	0.671907	Adjusted R-squar	0.603554	
F(5, 24)	9.829989	P-value(F)	0.000033	
Log-likelihood	-391.73	Akaike criterion	795.46	
Schwarz criterion	803.8671	Hannan-Quinn	798.1495	
rho	0.160335	Durbin-Watson	1.659581	

Further regression results were obtained to maintain the precision of the model. It shows that all independent variables, namely Traditional and Non-Traditional Coconut Products, Foreign Direct Investment Inflows, and Agricultural Expenditures are significant at 0.05 alpha, which means that they have a 95% level of significance to the Gross Value Added in Agriculture. The coefficient of determination (R<sup>2</sup>) was 0.67, which relates to a strong relationship between the independent variables and the Gross Value Added in Agriculture. The Durbin Watson has a value of 1.659 which is positive correlation. Traditional and Non-Traditional Coconut Product exports have the most significant relationship with the Gross Value Added in Agriculture with the p-value of <0.0001 level of significance. However, production value of coconuts and price of coconut have negative significant relationships with the gross value added of agriculture. This statistically, all

agricultural variable indicators have negative significant relationships with the Gross Value Added in Agriculture. This rejects the null hypothesis that production variables have no significant impact on the Gross Value Added in the Philippines.

1) Tests for Heteroskedasticity

The White's Test and Breusch-Pagan-Godfrey's Test for Heteroskedasticity was applied to identify if the distribution of the data variances are not equal and if the regression is dependent on the independent variables. Since the results show that the p-value of the f-stat is greater than the 0.05 significant level, the heteroskedasticity of the data is not present.

2) Test for ARCH

The Auto-Regressive Conditional Heteroskedasticity (ARCH)'s test was used to identify the volatility of the times series data used in this research. As the p-value of f-stat is greater than 0.05 significant level, there is no ARCH present from the data.

3) Test for Autocorrelation

Durbin Watson was used to testing the data's autocorrelation to identify if there are similarities between the variables. The test indicates no autocorrelation because the p-value of f-stat is greater than 0.05 significant level.

4) Test for Normality of Residuals

The Jarque-Bera test assesses whether or not sample data have skewness and kurtosis that are matched with a normal distribution. It is a goodness-of-fit test. Accept the null hypothesis that the residuals are normally distributed since the p-value of the f-stat, which is based on the results, is greater than the 0.05 level of significance.

5) Test for Specification Error

In statistics, the Ramsey Regression Equation Specification Error Test (RESET) is a general specification test for the linear regression model. It tests whether non-linear combinations of the fitted values help explain the response variable. Based on the results, the p-value of the f-stat is more significant than the 0.05 level of significance. Therefore, the null hypothesis is accepted.

6) Test for Stability

By using the Chow test, we may determine whether or not the regression coefficients for each regression line are equal. Based on the result, the p-value of the f-stat is greater than 0.2099 level of significance; therefore, accept the null hypothesis, which determines there is no structural breakpoint.

According to the PCA, the Philippines was the top exporter of coconuts in the world from 2014 to 2018, with average export revenues of P91.4 billion. PSA claims that the volume of the country's coconut exports in 2018 increased by 43.6% compared to 2017. The Philippine coconut industry has enormous potential to contribute to the overall economic growth of the country.

Table 3  
Diagnostic test result

White's Test for Heteroskedasticity	The p-value of f-stat (0.07605) is greater than 0.05 significant level
Breusch-Pagan-Godfrey's test for Heteroskedasticity	The p-value of f-stat (0.075416) is greater than 0.05 significant level
Test for ARCH:	The p-value of f-stat (0.624226) is greater than 0.05 significant level
Autocorrelation (Breusch-Godfrey Serial Correlation LM Test)	The p-value of f-stat (1.03218) is greater than 0.05 significant level
Normality for Residuals (Jacque-Bera)	The p-value of f-stat (0.382) is greater than 0.05 significant level
Specification Error (Ramsey's RESET)	The p-value of f-stat (3.47) is greater than 0.05 significant level
Stability (Chow Breakpoint)	The p-value of f-stat (0.2099) is greater than 0.05 significant level

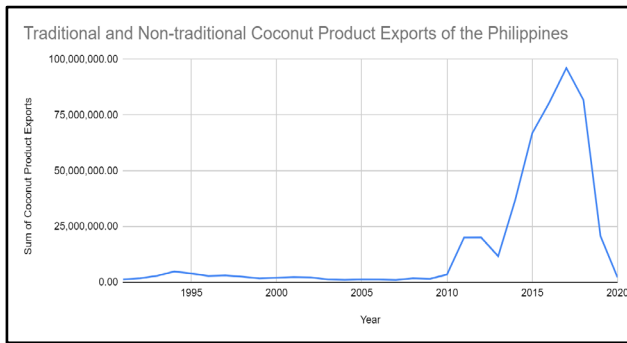


Fig. 2. Traditional and Non-Traditional



Fig. 3. Foreign direct investments

In order to accelerate and diversify agricultural output and introduce technology that would increase the competitive advantage of the sector's products, Laforga claims that foreign investments are needed. According to a number of organizations and experts, the government should also allow foreign investors to expand the nation's agricultural industry in order to guarantee food security. According to Agriculture Secretary William Dar, changes to the government's foreign investment regulations are required to promote the expansion of the agriculture industry. Furthermore, the Department of Agriculture will continue to develop and put into action the necessary policies to create and raise capital for the agriculture sector because modernization and industrialization are two of the four main pillars of the "OneDA Reform Agenda," and foreign direct investments (FDI) are essential to this process.

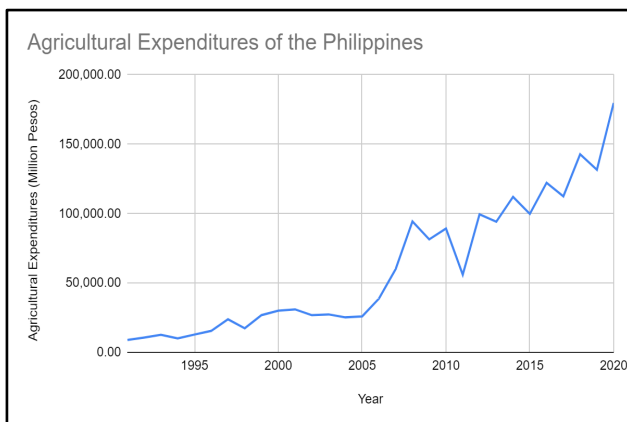


Fig. 4. Agricultural expenditures

Agricultural expenditures are the level of public spending that the government allots in the sector of agriculture and it is important that agricultural expenditures are being allocated efficiently to maximize the utilization of the agricultural resources for production of products, services and provide exports on the international trade. According to David (2003), agriculture accounts for a sizable amount of government spending that has been redistributive over the years, subsidizing private products and services such as foreign and domestic grain trade, livestock trade livestock and agro-processing companies. According to the Agricultural Public Expenditure Review of the Philippines in June 2007, the type of spending across the Major Final Outputs (MFO) has a significant impact on the economic composition of the DAR budget. Personnel spending amounted for 33% of DAR's budget from 1998 to 2005, with operations and maintenance and capital outlays accounting for 19% and 47% of the Department of Agrarian Reform's economic makeup. As predicted, the economic mix of expenditures to assist agricultural reform beneficiaries differs among the MFOs. This explains a stable level of agricultural expenditures from 1998 to 2005. In 2008, a 36.37\* increase has been observed due to the increase of capital expenditures at P2.87 billion pesos. 2020 has the largest amount of agricultural expenditures, amounting to 179,742 in million pesos.

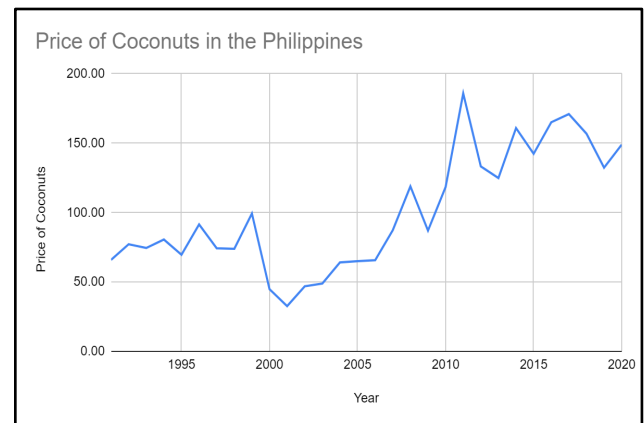


Fig. 5. Price of Coconuts in the Philippines

In year 2001, the production and supply to the markets was low due to the poor demand. Among the identified problems are the unorganized supply chain, vulnerability of the product to world price fluctuations, low farm productivity, recurring infestations of an insect called "cocolisap," the aging of the current crop of coconut trees, inadequate fertilization, insufficient farm to market roads, low allocation on research and development (R&D), and the presence of corruption and bureaucracy. (Villegas, 2022). In addition, according to the Philippine Statistics Authority (2009), the price adjustment in fruits and vegetables increased to 11.7% in 2008 due to the high year-to-end date inflation rate of 9.3%. In line with that, the price of coconuts had a high leap from 87.3 in 2007 to 118.9 in 2008. In year 2010, Coconut farmers were unable to recover from the El Niño phenomenon's dry spell in 2009 and 2010. (Philippine Journal of Science - Department of Science and Technology, n.d.) According to the Philippine Statistics



Authority (2011), Coconut farmers were able to recover from their 2010 slump due to higher prices, with gross receipts increasing by 92.92 percent.

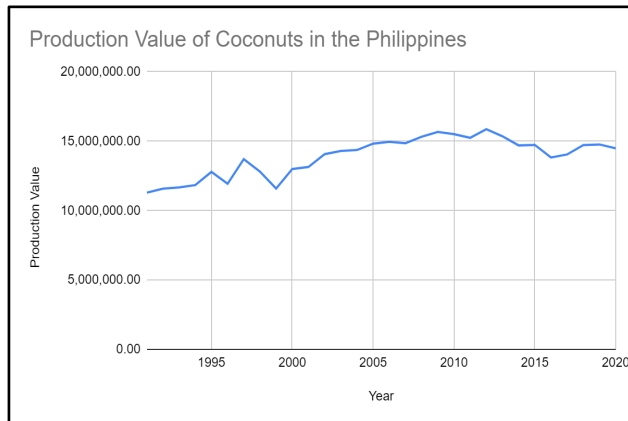


Fig. 6. Production Value of Coconuts in the Philippines

One of the primary concerns in the coconut goods exports is the descending output level, resulting in exporting countries failing to fulfill global demand as coconut flourishes in warmer settings since it is a tropical crop. Prior to the formation of AFMA (Republic Act 8435) in the 1990s, the primary program of significance was the World Bank-supported Coconut Farms Development Project (CFDP), which ran from 1991 to 1999. There are 645 coconut-based ARCs under DAR, the agricultural reform communities (ARCs) program, with around 350,000 beneficiaries. The objective for rehabilitating low-yielding palms was fulfilled: the area receiving at least two fertilizer treatments was 344,400 hectares, compared to an evaluation target of 348,000 hectares. With this, the economic rate of return for the whole project, assuming that all farmers continue to apply fertilizers at the recommended rates after project completion, is re-estimated at 32 percent, compared to 40 percent at appraisal. However, the absence of government unanimity on the particular features of the long-term coconut development program to be pursued is a severe challenge at project completion. Only one of every four private seed gardens intended for the establishment was established, and nursery management and seed quality were poor. The replanted area surviving at project completion was 77% of the evaluation objective due to severe drought and low seedling quality. Cover-cropping and intercropping of replanted areas made little progress. The Philippine Coconut Authority extension personnel rose less than planned, and there were delays in developing laboratory facilities and other infrastructure. This has led to the fluctuating amount of production value from 1990 to 1999, being the lowest at 1999 with only 11,589,010. (Operation Evaluations Department, 2000).

The GMA coconut program entitled "Maunlad na Niyugan Tugon sa Kahirapan Program" was launched on February 10, 2000; it sought to increase the productivity of coconut production and rehabilitation of coconut farms and infrastructure. However, there were no improvements in coconut production, and the Medium-Term Philippine Development Plan (MTPDP) was established in 2004. This

chapter has provided 1.35 million hectares for coconuts, hence, a more stable production value from 2004 to 2010. (Global Forum on Migration and Development, 2014).

## 5. Conclusion and Recommendation

The Philippine Coconut Industry Roadmap 2021-2040 shows that the coconut industry is the recommended priority of Philippine Coconut Authority and Department of Agriculture. The result shows that the independent indicators namely price of coconuts and production value of coconuts are insignificant to the Gross Value Added in Agriculture. Traditional and Non-Traditional Coconut Products and Agricultural Expenditures had negative effects on Gross Value added in Agriculture. Foreign Direct Investment Inflows are statistically significant and wielded positive effects respectively on Gross Value Added in Agriculture. This research uses the multiple regression method in order to assess the relationship of the traditional and non-traditional coconut products and its effect to the country's economy with the Gross Value Added in Agriculture in the Philippines.

Moreover, the data was from the Food and Agriculture Organization Corporate Statistical Database (FAOSTAT) and the Philippine Statistics Authority (PSA). Finally, based on its findings, the research developed recommendations to navigate the overview of the coconut in the Philippines and cultivate the objectives of the Philippine Coconut Industry Roadmap. Diagnostic tests were conducted before utilizing the model to forecast in order to identify any errors and ensure that it was valid and accurate. The analysis was based on the econometric analysis of time series in the last three decades covering the period 1991 to 2020. The data gathered were placed in a statistical application entitled 'gretl' to identify the ordinary least squares and multiple regression.

This research recommends that the Philippine government should advance with the implementation of the recently launched 18-year PCA Transformation Roadmap (PTR) by the Philippine Coconut Authority (PCA), which sets the direction for PCA to become a globally recognized establishment championing a market-driven coconut sector by 2038. Additionally, it is also recommended that the government should regulate policies that will control the production setting of coconut by the dealers and coconut companies. The government must implement a farm to market road and other infrastructure projects to ease the marketing of coconut products. In addition, the farmers should be encouraged to participate in the programs of the government and be part of the implementation process. It supports millions of Filipino farmers and workers and has been a significant contributor to the country's economic growth. The Philippine government approved the CFIDP through Executive Order 172, signed on June 2, 2022, paving the way for the utilization and release of the P75-billion fund provided by Republic Act (RA) 11524, also known as the "Coconut Farmers and Industry Fund Act."

The CFIDP, with guaranteed funding of P75 billion over five years, has the potential to have a vast, I mean huge, impact on the Philippine coconut industry and the 3.5 million farmers who rely on it. And many of our coconut farmers are among the

"poorest of the poor" in our country. As the country's top produced product, we need to increase the proportion of the coconut subsector to total agricultural gross value added. Furthermore, supporting the Philippine Coconut Authority's proposal to address the value chain commodity cluster of coconuts for further research and development of Enterprise Development Project for coconut farmers, production and extension of coconut commodities and financing sustainable and efficient investment promotions with other non-government organizations (NGOs), such as Department of Trade and Industry (DTI), Department of Agriculture (DOA) and Department of Agrarian Reform (DAR) to advance these objectives. Further research on this study is supported and highly recommended.

## References

- [1] Ahuja, S. C., Ahuja, S., & Ahuja U. (2014). Coconut - History, uses, and folklore. *Journal of Asisan Agri-History*, 18(3):221-248
- [2] Andriess, (2019). Primary Sector Value Chains, Poverty Reduction, And Rural Development Challenges in The Philippines.
- [3] Aquino, A. and Ani, P. (2016). The long climb towards achieving the promises of the tree of life: a review of the Philippine coconut levy fund policies.
- [4] Arunlandoo, X. et al., (2017). The Coconut Palm.
- [5] Balié, J and Valera, H.G(2020). Domestic and international impacts of the rice trade policy reform in the Philippines. *Food Policy*, 92, 101876.
- [6] Bannett, (2018). Pacific Coconut: Comestible, Comfort and Commodity
- [7] Briones R.M (2013). Agriculture, Rural Employment, and Inclusive Growth.
- [8] Briones R.M (2013). Philippine Agriculture to 2020: Threats and Opportunities from Global Trade.
- [9] Briones, R. and Israel D. (2014) Choke Points and Opportunities in the Supply Chain of ASEAN Agricultural Products: A Philippine Country Study.
- [10] Briones, R. M. (2017). Outlook for the Philippine Economy and Agro-Industry to 2030: The Role of Productivity Growth.
- [11] Briones, R.M (2013). Agriculture, Rural Employment, and Inclusive Growth. <https://www.econstor.eu/handle/10419/126960>
- [12] Britannica, The Editors of Encyclopedia. "coconut". *Encyclopedia Britannica* (2021). <https://www.britannica.com/plant/coconut>
- [13] Coconut Oil in Philippines - The Observatory of Economic Complexity. <https://oec.world/en/profile/bilateral-product/coconut-oil/reporter/ph>
- [14] Costales, Cecilio., (2020). "Trade and value chains in employment-rich activities (TRAVERA) study of selected non- traditional coconut products in the Philippines," ILO Working Papers 995072489602676, International Labour Organization.
- [15] Crost, B. and Felter, J (2020). Export Crops and Civil Conflict, *Journal of the European Economic Association*, Volume 18, Issue 3, June 2020, Pages 1484–1520.
- [16] Das, A.K. et al., (2022). Coconut oil for utility transformers – Environmental safety and sustainability perspectives. *Renewable and Sustainable Energy Reviews*.
- [17] David, C. (2003). "Agriculture." *The Philippine Economy: Development, Policies, and Challenges*. A. Balisacan and H. Hill, eds. Ateneo de Manila University Press, Quezon City.
- [18] Department of Agriculture (2022). Philippine of Coconut Industry Coconut: Major Export Crop of Filipino Farmers
- [19] Department Of Agriculture: Philippine Coconut Authority (2019). Annual Report 2019. [https://pca.gov.ph/images/pdf/annualreport/PCA\\_2019\\_Annual\\_Report.pdf](https://pca.gov.ph/images/pdf/annualreport/PCA_2019_Annual_Report.pdf)
- [20] Department of Trade and Industry (2022). PH exports continue to recover boosted by surge in coconut oil sales. <https://www.dti.gov.ph/archives/emb-news-archives/ph-exports-continue-to-recover-boosted-by-surge-in-coconut-oil-sales/>
- [21] Doloriel, N. et al (2013). Ricing Movements of Copra in the Philippines.
- [22] Dy (2006). *The Philippine Coconut Industry: Performance, Issues, and Recommendations*. <https://pdfslide.net/documents/4938753-the-philippine-coconut-industry-performance-issues-and-recommendations.html?page=2>
- [23] Espino, R. R. C, & Atienza, S. C (n.d) Crop Diversification in the Philippines, <https://www.fao.org/3/x6906e/x6906e0a.htm>
- [24] FAOSTAT. (2015). Food and Agricultural Organization of the United Nations. from Statistics Division.
- [25] FAOSTAT. Area, production, and yield of leading coconut-producing countries. 2015-2019. Retrieved from fao.org.
- [26] FFTC Agricultural Policy Platform (2019). *The Philippine Coconut Industry: Status, Policies and Strategic Directions for Development*
- [27] FSIN (2021). *Global Report on Food Crises Joint Analysis for Better Decisions*
- [28] Gurbuz, I. and Manaros M. (2019) Impact of Coconut Production on the Environment and the Problems Faced by Coconut Producers in Lanao Del Norte Province Philippines.
- [29] History of the Coconut in the Philippines. (n.d) Historical Perspective. Department of Agriculture Philippine Coconut Authority
- [30] Hoe, T. (2018). *The Current Scenario and Development of the Coconut Industry. Current-Scenario-and-Development-of-the-Coconut-Industry.pdf*"
- [31] ICR Review: Coconut Farms Development Project: Operations Evaluation Department, <https://documents1.worldbank.org/curated/en/283721474493499871/pdf/000020051-20140529065317.pdf>
- [32] Ignacio, I and Miguel, T., (2021). Research opportunities on the coconut (*Cocos nucifera* L.) using new technologies.
- [33] Inter-agency task force technical working group for anticipatory and forward planning. (2020). *We recover as one*,
- [34] International Trade Centre, (2012). Trade Map. [http://www.trademap.org/Country\\_SelProduct\\_TS.aspx](http://www.trademap.org/Country_SelProduct_TS.aspx)
- [35] Javier E. (2015) Modernization of the Coconut Industry <https://nast.ph/images/pdf/%20files/Publications/Bulletins/NAST%20Bulletin%20no.%208%20-%20Modernization%20of%20the%20Coconut%20Industry.pdf>
- [36] Jayadi, A. and Azhar, H. (2017). Comparative Advantage Analysis and Products Mapping of Indonesia, Malaysia, Philippines, Singapore, Thailand, and Vietnam Export Products.
- [37] Kemmerling B., Schetter C. & Wirkus L. (2022). The logics of war and food (in)security. *Global Food Security*.
- [38] Laforga, B. M. (2021). Allow foreigners in agriculture sector, government asked. <https://www.bworldonline.com/top-stories/2021/05/24/370343/allow-foreigners-in-agriculture-sector-government-asked/>
- [39] Loida E. et al (2013). "Good Agricultural Practices (GAP) in the Philippines: Status, Issues, and Policy Strategies," Monograph, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA), number 2013:218.
- [40] Marcus, J.B. (2013). *Lipids Basics: Fats and Oils in Foods and Health: Healthy Lipid Choices, Roles and Applications in Nutrition, Food Science and the Culinary Arts*. Culinary Nutrition.
- [41] Mondal, I. and Prasanna Kumar, G. V. (2016). Development of an Electric Motor Powered Low Cost Coconut Deshelling Machine. *Journal of The Institution of Engineers (India): Series A*, 97(2), 105–109.
- [42] Mopera, L. E. (2016). *Food Loss in the Food Value Chain: The Philippine Agriculture Scenario*.
- [43] Moreno, M. L., Kuwornu J, K. M., & Szabo, S. (2020). Overview and Constraints of the Coconut Supply Chain in the Philippines, *International Journal of Fruit Science*, 20:sup2, S524-S541.
- [44] Nayar, N Madhavan (2017). *The Coconut, The Coconut in the World*, (), 1–8.
- [45] Oleke, J. et al., (2012). Farmers' perception of coconut mite damage and crop diversification alternatives in the coastal belt of Tanzania.
- [46] Pacinabao, K. (2019). Determinants of the Gross Value Added (GVA) of Major Export Sectors in the Philippines. <https://s-space.snu.ac.kr/bitstream/10371/161767/1/000000156902.pdf>
- [47] Padua, M. A. K. (2015). Small farmer access to premium prices for copra in the Philippines: A case study of the coconut oil chain in Camarines Sur province. Master Thesis. Lincoln University.
- [48] Patil, U. and Benjakul, S. (2018). Coconut Milk and Coconut Oil: Their Manufacture Associated with Protein Functionality. *Journal of Food Science*.
- [49] PCA (The Philippine Coconut Authority), 2013. *Outlook for the Coconut Industry*, Bangko Sentral ng Pilipinas. Diliman, Quezon City.
- [50] Pham, Laura J. (2016). *Industrial Oil Crops, Coconut (Cocos nucifera)*, 231–242.

- [51] Philippine Action Plan for Family Farming 2019-2028. (2021). Food and Agriculture Organization of the United Nations.
- [52] Philippine Agriculture 2020: A strategy for poverty reduction, food security, competitiveness, sustainability, and justice and peace (2020). National Academy of Science and Technology, Philippines.
- [53] Philippine Coconut Authority (2020). Product Information Desiccated Coconut.
- [54] Philippine Coconut Authority (2022). The Philippine Coconut Industry Roadmap (2021-2040). Elliptical Road, Diliman, Quezon City 1100, Philippines.
- [55] Philippine Department of Agriculture (2000) Adopting the “Maunlad na Niyugan Tugon sa Kahirapan” Program and Establishing Mechanisms for its implementation  
<https://www.da.gov.ph/wp-content/uploads/2016/11/EO210.pdf#:~:text=Niyugan%20Tugon%20sa%20Kahirapan%20Program%2C%20hereinafter%20referred%20to,Agrikulturang%20Makamasa%20Program%2C%20the%20national%20agricultural%20productivity%20program>.
- [56] Philippine Journal of Science - Department of Science and Technology (n.d.). The 2009-2010 El Niño Southern Oscillation in the Context of Climate Uncertainty: The Philippine Setting.  
<https://philjournalsci.dost.gov.ph/home-1/31-vol-139-no-1-june-2010/414-the-2009-2010-el-nino-southern-oscillation-in-the-context-of-climate-uncertainty-the-philippine-setting>
- [57] Philippine Statistics Authority (1991). Selected Statistics on Agriculture (May 1991).  
<https://psa.gov.ph/sites/default/files/1991%20May%20SSA.pdf>
- [58] Philippine Statistics Authority (1994). Selected Statistics on Agriculture (May 1994). <https://psa.gov.ph/sites/default/files/1994%20SSA.pdf>
- [59] Philippine Statistics Authority (1997). Selected Statistics on Agriculture (May 1997). <https://psa.gov.ph/sites/default/files/1997%20SSA.pdf>
- [60] Philippine Statistics Authority (2001). Selected Statistics on Agriculture (June 2001). Retrieved from <https://psa.gov.ph/sites/default/files/2001SSA.pdf>
- [61] Philippine Statistics Authority (2009). Summary Inflation Report Consumer Price Index (2000=100): December 2008.  
<https://psa.gov.ph/content/summary-inflation-report-consumer-price-index-2000100-december-2008>
- [62] Philippine Statistics Authority (2011). Performance of Philippine Agriculture: January - March 2011.  
[https://psa.gov.ph/sites/default/files/perf\\_janmar2011.pdf](https://psa.gov.ph/sites/default/files/perf_janmar2011.pdf)
- [63] Philippine Statistics Authority (2020).  
[https://psa.gov.ph/sites/default/files/AIS\\_Agri%20Exports%20and%20Imports%202020\\_signed\\_0.pdf](https://psa.gov.ph/sites/default/files/AIS_Agri%20Exports%20and%20Imports%202020_signed_0.pdf)
- [64] Philippine Statistics Office (2008). 2008 Annual Survey of Philippine Business and Industry: Agriculture, Hunting and Forest.  
[https://psa.gov.ph/sites/default/files/ASPBI\\_Agriculture%2C%20Hunting%20and%20Forestry%202008.pdf](https://psa.gov.ph/sites/default/files/ASPBI_Agriculture%2C%20Hunting%20and%20Forestry%202008.pdf)
- [65] Prades, A. et. al (2016). New era for the coconut sector. What prospects for research?.
- [66] Prades, A.; Salum, U.N.; Pioch, D. (2016) New era for the coconut sector. What prospects for research? OCL 23(6).
- [67] PSA. (2018). Philippine Agriculture in Figures, 2015. Quezon City: Philippine Statistics Authority (PSA).  
<http://countrystat.bas.gov.ph/?cont=3>
- [68] Roy, S. (2022). Foreign Direct Investment and Economic Growth: An Analysis for Selected Asian Countries.
- [69] Sagena, U. (2021). Coconut Industry in the Philippines: Actors, Interactions and Innovation. Nusantara Journal of Social Sciences and Humanities, 1(1), 91-99.
- [70] Salazar, (2013). Going Organic in the Philippines: Social and Institutional Features
- [71] Serião, M. et al., (2021). Impact of the 2013 super typhoon haiyan on the livelihood of small-scale coconut farmers in Leyte Island, Philippines
- [72] Sertelis, A. (1992). Export growth and Canadian economic development., 38(1), 0-145.
- [73] Shankar, P. et. al. (2013), Coconut oil: a review.
- [74] Simon, G. A. (2012). History of Food Security. Food and Agriculture Organization of the United Nations.
- [75] Smyth, S. J., Webb, S. R., & Phillips P. W.B. (2021). The role of public-private partnerships in improving global food security. Global Food Security.
- [76] Stein, H. H., et. al (2015). Nutritional value of high fiber co-products from the copra, palm kernel, and rice industries in diets fed to pigs.
- [77] Tacio, H. (2019). Coconut: Major Export Crop of Filipino Farmers.  
<https://pca.gov.ph/index.php/10-news/234-coconut-major-export-crop-of-filipino-farmers>
- [78] Talavera, C. (2021). Coco sector attracts P4.3 million investments, Philippine Star Global.  
<https://www.philstar.com/business/2021/08/18/2120667/coco-sector-attracts-p43-million-investments>
- [79] The World Bank Group (2007). Philippines: Agriculture Public Expenditure Review.  
<https://documents1.worldbank.org/curated/en/508941468298444655/pdf/40493.pdf>
- [80] Tinchan, P.; Lorjaroenphon, Y.; Cadwallader, K.R. and Chaiseri, S. (2015): Changes in the profile of volatiles of canned coconut milk during storage. J Food Sci. 80:C49-C54.
- [81] Tiongco, M M. & Francisco K. A (2011). Philippines: Food Security versus Agricultural Exports.  
<https://www.econstor.eu/bitstream/10419/126868/1/pidsdps1135.pdf>
- [82] Trade, liberalization, and foreign investment in the Philippines.  
<http://www.ijbmm.com/paper/May2018/584073729.pdf>
- [83] UNCTAD (United Nations Conference on Trade and Development) (2012). INFOCOMM - COMMODITY PROFILE COCONUT. AAACP Products.
- [84] Urrutia, J. et. al (2018). Analysis of Factors Influencing Agricultural Productivity in the Philippines.
- [85] Vagsholm, I., Arzoomand, N. S., & Boqvist, S. (2020). Food Security, Safety, and Sustainability—Getting the Trade-Offs Right.
- [86] Villegas, B.M (2022). Addressing the challenge of agricultural development: The coconut.  
<https://www.bworldonline.com/opinion/2022/09/13/474356/addressing-the-challenge-of-agricultural-development-the-coconut/>