

DETERMINING THE FARM-TO-RETAIL PRICE TRENDS AND DYNAMICS OF AGRICULTURAL COMMODITIES IN LUZON FROM 2018-2020

Jeffrey Banico, Christine Bolaños, Meraflor Genovania,

Vincent Reperoga, Hannah Sophia Revoltar

College of Science, Bicol University, Legazpi City Albay, Philippines

Philippines holds to be one of the quintessential lands for agriculture on account of its abundance in lush and verdant foliage. Accordingly, agriculture has been dubbed as the backbone of the Philippine economy. As determined by Statista Research Department (2021), a great number of Filipinos remain contingent on agricultural sectors such as farming, fisheries, livestock, and forestry as part of, or as their sole livelihood. Among the three geographical divisions of the Philippines, Luzon yields 44% of the crops, 57% of the livestock, 66% of the poultry, and 52% of the fish, hence, devoting its vast expanse of cultivated land to half of the aggregated agricultural production in the entire country (Giles et. al, 2019).

Agriculture is one of the principal players in keeping the economy afloat, contributing an average of 20% to the Gross Domestic Product (CIDA-LGSP, 2003). However, as per Department of Agriculture (2020), in the years 2018 and 2019, it has exhibited drastically low growth performance. Particularly, 2019 has almost been the most challenging year in the agricultural sector on grounds of the implementation of Republic Act 11203 (Rice Tariffication Law) as well as the initial outbreak of African swine fever, until 2020. Moreover, the eruption of Taal volcano, manifestation of strong tropical cyclones, and the emergence of COVID-19 pandemic were among the major events in the year 2020 which immensely jeopardized food security and overall agricultural production system in the Philippines.

With the plight of agriculture over the past three years, fluctuations on farm gate and retail prices of agricultural commodities were foreseen. This study directs its focus on determining the trends and dynamics in the farm gate price, or the price of the agricultural produce sold directly from the producer, and the retail price, or the price of the agricultural produce sold from the retailer, for each type of commodity (Russo & Goodhue, 2017). Specifically, this study limits its scope to provinces within Luzon and sets its sights on analyzing three years worth of data, from 2018 to 2020.

OBJECTIVES

The farm gate and retail prices (from 2018 to 2020) of different types of agricultural commodities in Luzon were the identified focus of the study.

Specifically, this paper seeks to fulfill the following objectives:

- 1. To provide the quarterly statistics on farm gate and retail prices of agricultural commodities in Luzon from 2018 to 2020**
- 2. To determine the highest and lowest farm gate and retail prices of agricultural commodities in Luzon from 2018 to 2020**
- 3. To determine the provinces in Luzon with the highest and lowest farm gate and retail prices on agricultural commodities from 2018 to 2020**

METHODOLOGY

This section describes the general methodologies, including the sources, processes, and approach employed for the execution of the study.



Figure 1. Methodology

Data Source

The data utilized in the study were obtained from the OpenStat database of Philippine Statistics Authority (PSA), which is an open source system with comprehensive cataloguing, publishing, and visualization tools. The data gathered were narrowed down to farm gate and retail price series of agricultural commodities in the provinces of Luzon, from 2018 to 2020, which falls under the PSA's economic classification. The observed raw data were made up of 20 fields with 13,000 rows for retail price and 20,000 rows for the farm gate price. The number of fields yielded in the processed data remained at 20 columns, with 38,074 rows, making up the entire processed data.

Data Preparation

For the fulfillment of the desired input for the study, the data obtained from the OpenStat database of Philippine Statistics Authority were subjected to cleaning and processing through the aid of Tableau Prep Builder. Tableau is a tool that makes use of visualization to improve the flow of analysis and make data more accessible to people. Tableau Prep Builder was employed in the study in the process of ingesting the raw data and transforming it by simulating various data types, grouping of values, and merging of rows and columns during the process.

Data Visualization

In the process of data visualization, Tableau Desktop was used, with bar graph, map, and line graph as the types of graphs primarily applied in the study. This tool was used to provide graphical representation of the data which were processed priorly using the Tableau Prep Builder. Generally, the services of Tableau were employed in the best interest of fulfilling the objectives of the study.

RESULTS AND DISCUSSION

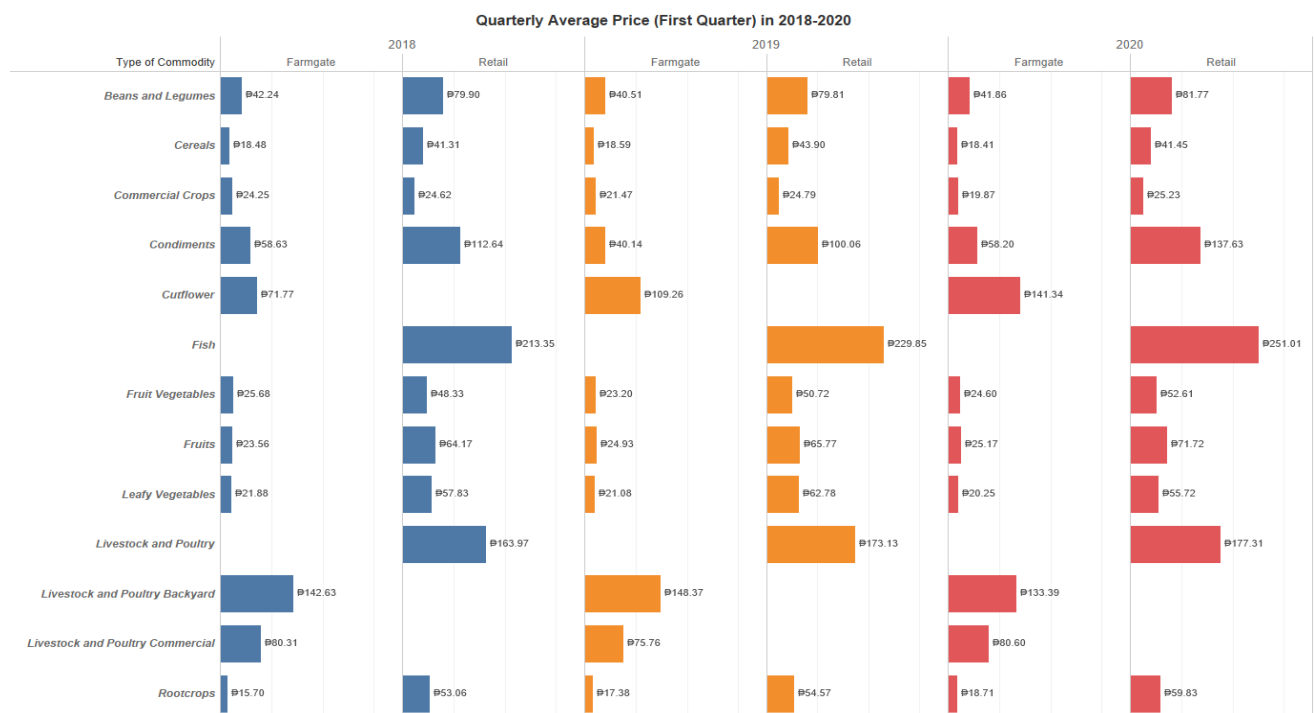


Figure 2. Quarterly Average Price (First Quarter) in 2018-2020

Figure 2, Figure 2.1, Figure 2.2, and Figure 2.3 aim to provide the quarterly statistics on the average farm gate and retail prices of agricultural commodities in Luzon from 2018 to 2020.

During the first quarter of the year 2018, Livestock and Poultry Backyard obtained the highest average farm gate price with ₱142.63, and Rootcrops having the lowest average farm gate price with ₱15.70. Fish and Livestock and Poultry have the highest retail prices with ₱213.35 and ₱163.97, respectively. In the first quarter of the year 2019, the prices of some types of commodities in Luzon have expressed a notable increase, both in the farm gate and retail prices including Cereals, Cutflower, Fruits, Livestock and Poultry Backyard, and Rootcrops, while the rest of the commodities have generated lower prices compared to the first quarter of 2018. In the following year, 2020, Rootcrops, Livestock and Poultry Commercial, Fruits, and Cutflower reached their highest farm gate prices compared to the first quarter of the past two years with ₱18.71, ₱80.60, ₱25.17, ₱141.31 respectively. Most of the retail prices of the types of commodities have increased during this period.

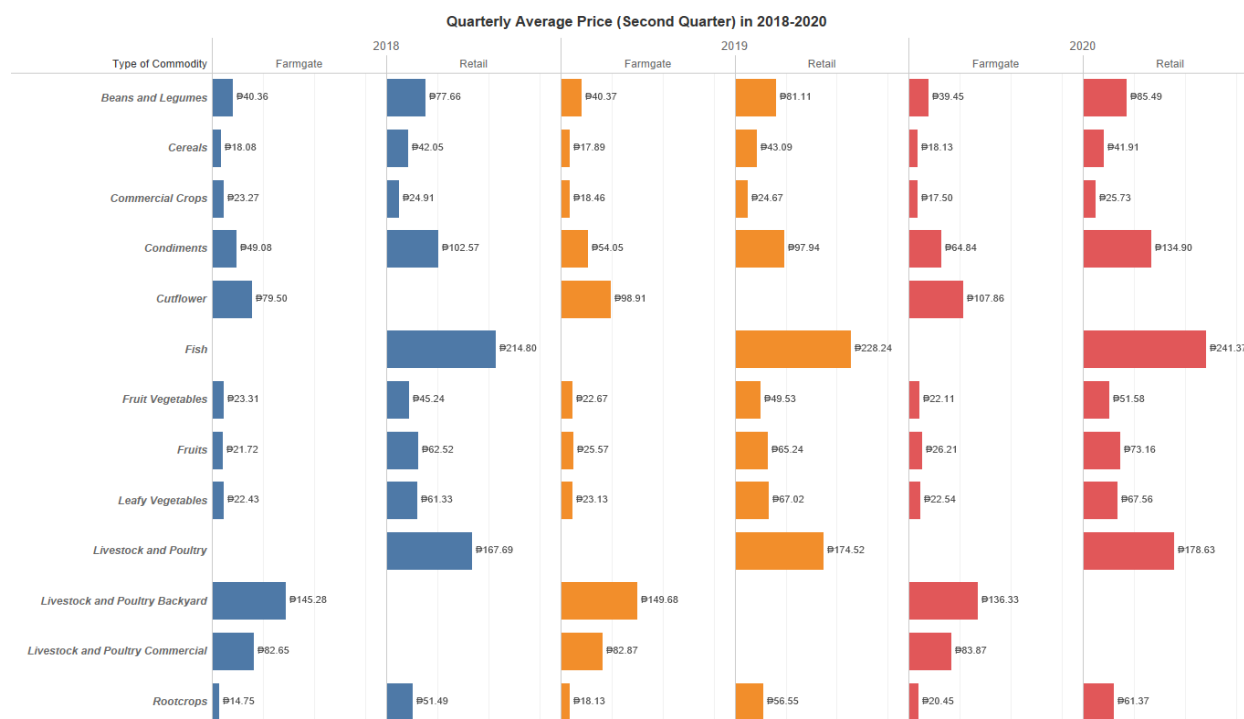


Figure 2.1 Quarterly Average Price (Second Quarter) in 2018-2020

In the course of the second quarter of 2018, the average farm gate price of Cutflower, Leafy Vegetables, Livestock and Poultry both Commercial and Backyard, became progressively greater compared to the first quarter of the same year. Most of the retail prices have accelerated except for the Beans and Legumes, Condiments, Fruit Vegetables, Fruits, and Rootcrops. In the second quarter of 2019, the average farm gate price of Beans and Legumes, Cereals, Commercial Crops, Condiments, Cutflower, and Fruit Vegetables have diminished, while the rest of the commodities have their prices escalated compared to the second quarter of the year 2018. Meanwhile, the retail prices of each of the types of commodities have gradually increased. Throughout the second quarter of the year 2020, nearly all the prices of commodities have risen both for farm gate and for retail.

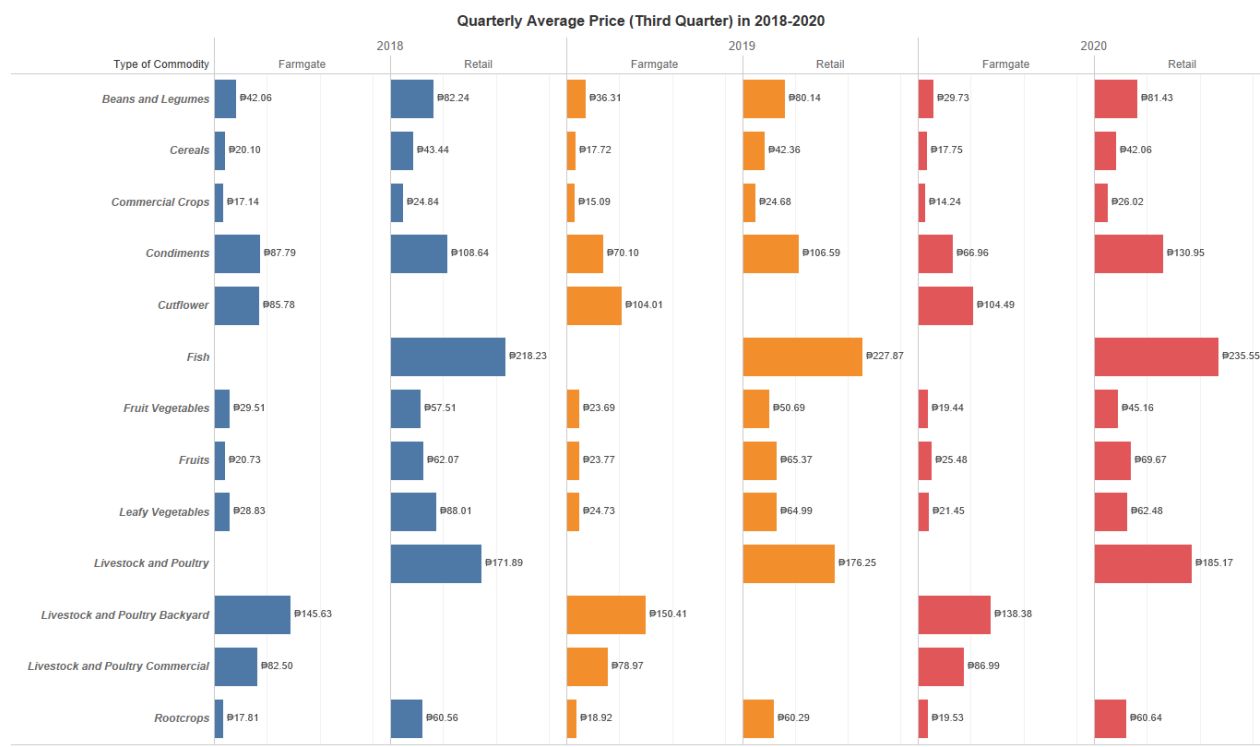


Figure 2.2 Quarterly Average Price (Third Quarter) in 2018-2020

By the third quarter of the year 2018, Beans and Legumes, Cutflower, Fruit Vegetables, Fruits, Leafy Vegetables, and Livestock and Poultry Backyard have witnessed an increase in their farm gate prices, while that of the rest of the commodity types have decreased. In terms of retail price, Cutflower and Fruits have their prices decreased compared to the last quarter of the same year. During the third quarter of the year 2019, the farm gate prices of most of the commodities have diminished except for Cutflower, Fruits, Livestock and Poultry Backyard, and Rootcrops. Most of the aforementioned commodities saw an improvement in their retail prices, including Fish, as compared to the third quarter of the past year. In the third quarter of the year 2020, the farm gate prices as well as the retail prices of the types of commodities have increased exponentially, as compared to the third quarter of the past two years.

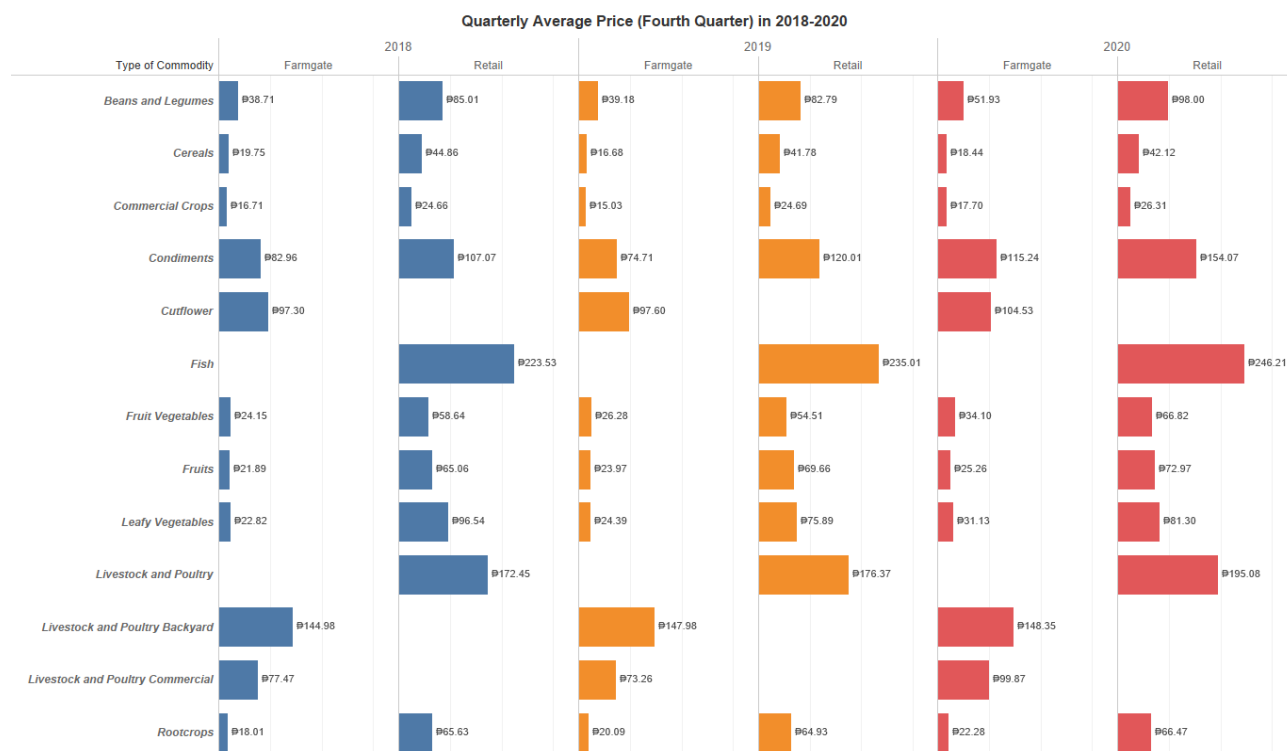


Figure 2.3 Quarterly Average Price (Fourth Quarter) in 2018-2020

Within the fourth quarter of 2018, most of the commodities have decreased in their farm gate price except for Cutflower, Fruits, and Rootcrops. Retail prices have risen for most of the commodities except for Condiments and Commercial Crops which have their retail prices decreased as compared to the third quarter of the same year. In the fourth quarter of the year 2019, the farm gate prices of Livestock and Poultry Commercial, Cereals, Commercial crops, Condiments have diminished, while the rest of the condiments have increased in their farm gate prices. Most of the aforementioned commodities have also increased in their retail price, including Fish, as compared to the fourth quarter of the year 2018. In the fourth quarter of the year 2020, all of the commodities have their average prices increased both in farm gate and in retail.

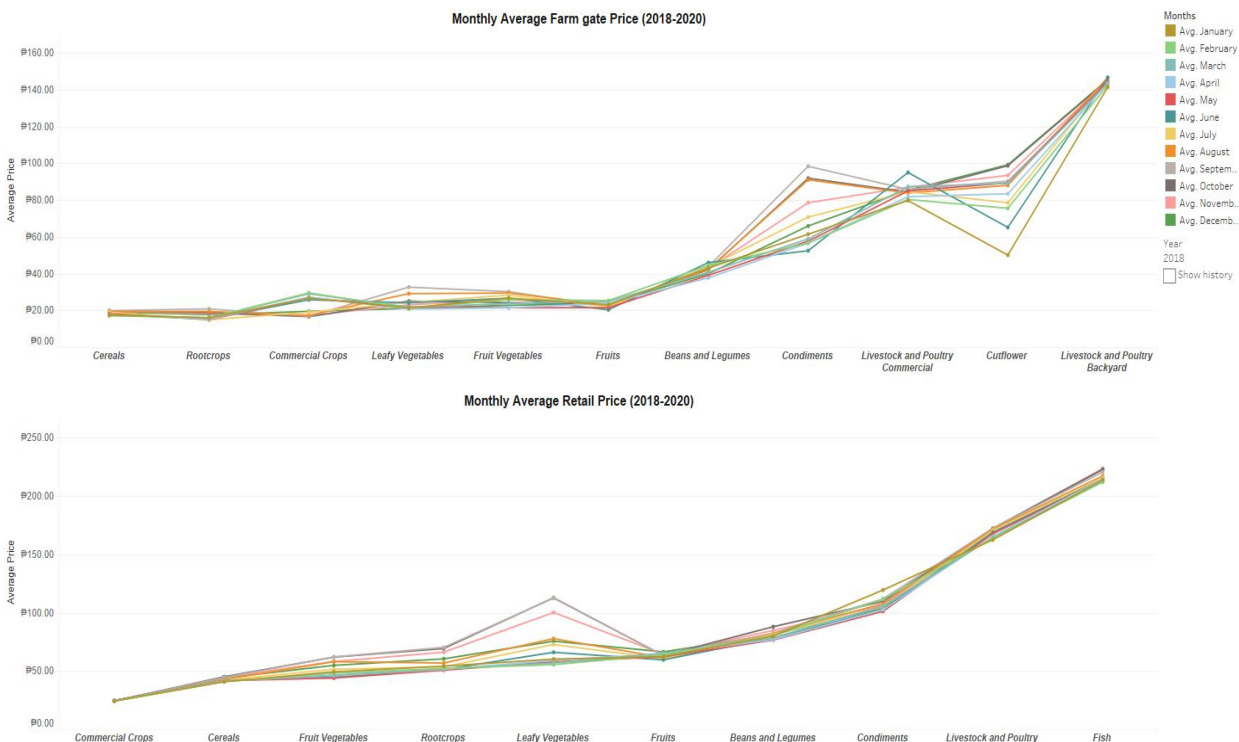


Figure 3. Monthly Average Farm gate and Retail Price (2018)

Over the course of the year 2018, the farm gate and retail price of Cereals and Rootcrops almost remained steadily. In the month of September, Cereals, Rootcrops, Leafy Vegetables, Fruit Vegetables, and Condiments obtained their highest farm gate price. Among the commodity types with the three highest average farm gate prices were Livestock Poultry Backyard with ₱146.79, Cutflower with ₱99.38, and Condiments with ₱98.57. On the other hand, Rootcrops, Commercial Crops, and Cereals secured the lowest average farm gate prices with ₱15.10, ₱16.80, and ₱17.25, respectively. During the month of May, four of the types of commodities in Luzon including Fruit Vegetables, Rootcrops, Beans and Legumes, and Condiments manifested a downturn in their retail price. Fish with ₱224.06, Livestock and Poultry

with ₱172.72, and Condiments with ₱119.82 were among the commodity types with the highest average retail price.

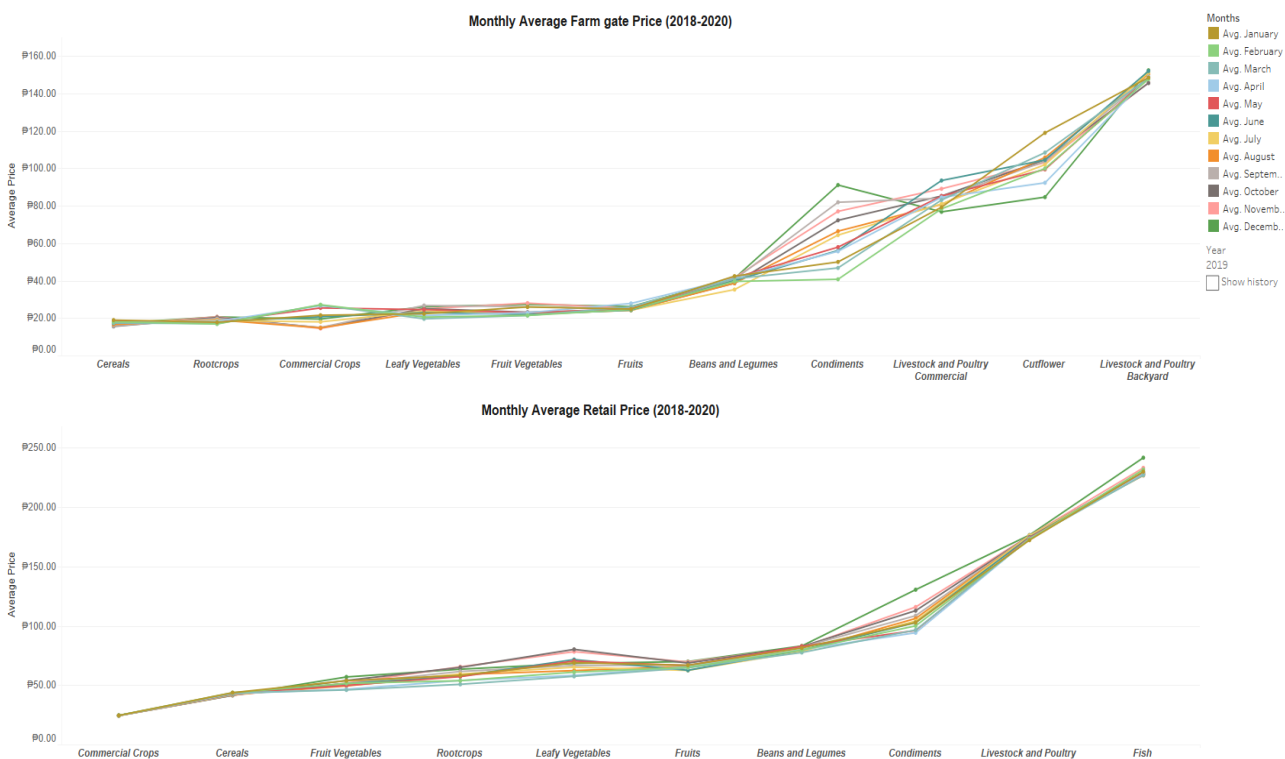


Figure 3.1 Monthly Average Farm gate and Retail Price (2019)

In 2019, almost all the types of commodities available in Luzon excluding Fruits, Cutflower, and Livestock and Poultry Backyard experienced a decline in their farm gate price, and Fruits, Condiments, Livestock and Poultry, and Fish in their retail price, as compared to the data from 2018. In the month of January, Cereals, Beans and Legumes, and Cutflower acquired their highest average farm gate price. Livestock and Poultry Backyard with ₱152.55, Cutflower with ₱119.12, and Livestock and Poultry Commercial with ₱93.66 were among the types of

commodities with the highest average farm gate price in the year 2019. Similar to 2018, Commercial Crops, Cereals, and Rootcrops still obtained the lowest average farm gate price. Fish remained as the commodity type in Luzon with the highest average retail price at ₱242.00, followed by Livestock and Poultry with ₱176.81, and Condiments with ₱130.77. Commercial Crops with ₱24.60 secured the lowest average retail price among the other types of commodities.

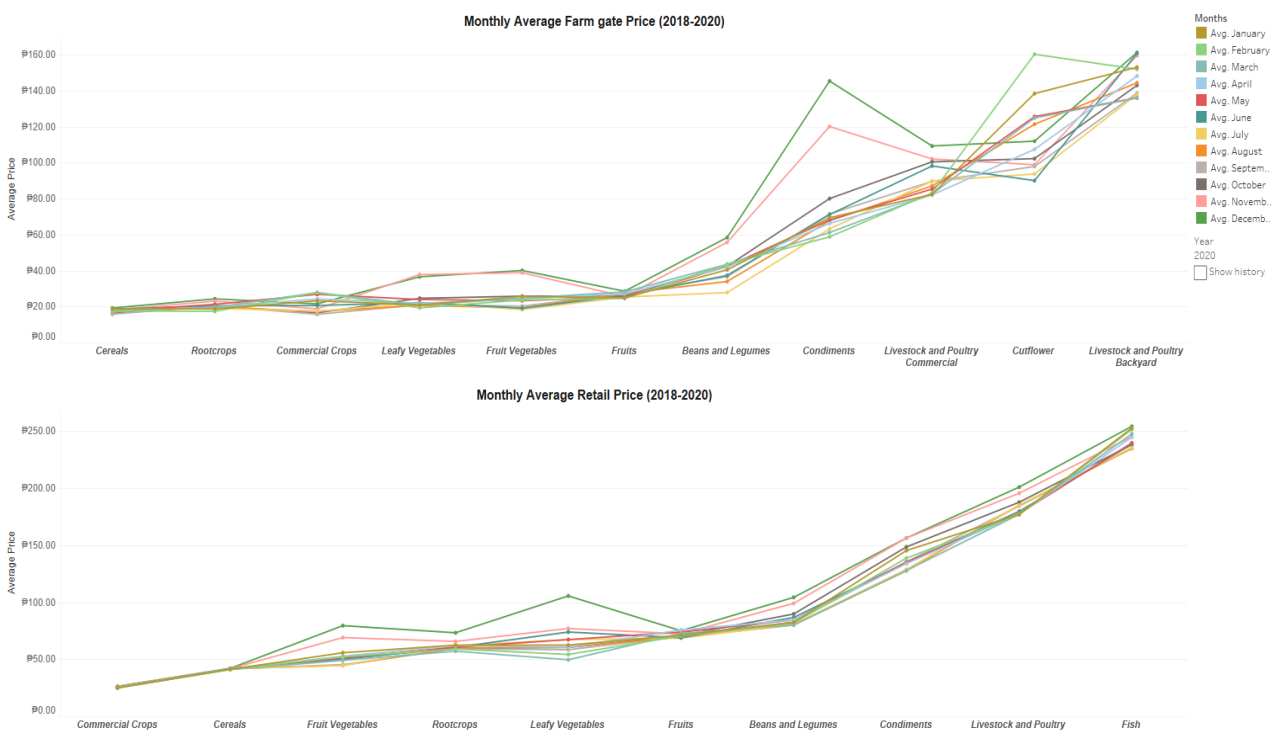


Figure 3.2 Monthly Average Farm gate and Retail Price (2020)

The farm gate price of different types of commodities in Luzon seized an upward momentum in the year 2020. However, both the farm gate and retail prices of Cereals cascaded in the same year. Conforming to the data in 2018, Livestock and Poultry Backyard, Cutflower,

and Condiments acquired the highest average farm gate price with ₱161.38, ₱160.45, and ₱145.56, respectively. Likewise, similar to the consolidated data from 2018 and 2019, Commercial Crops, Rootcrops, and Cereals were among the commodity types with the lowest average farm gate and retail price as well as Fish as the highest average retail price at ₱254.60.

Table 1. Highest and Lowest Monthly Average Farm gate and Retail Price of the Types of Commodities in Luzon (2018-2020)

FARM GATE PRICE						
Type of Commodity	Year					
	2018		2019		2020	
	HMAFP	LMAFP	HMAFP	LMAFP	HMAFP	LMAFP
Cereals	₱20.07	₱17.25	₱19.13	₱15.75	₱19.41	₱15.95
Rootcrops	₱21.03	₱15.10	₱20.87	₱17.04	₱24.46	₱17.53
Commercial Crops	₱29.71	₱16.80	₱27.33	₱14.63	₱28.01	₱15.86
Leafy Vegetables	₱32.86	₱20.86	₱26.93	₱19.80	₱37.99	₱19.45
Fruit Vegetables	₱30.40	₱21.64	₱28.18	₱21.55	₱40.25	₱18.54
Fruits	₱25.57	₱20.54	₱28.03	₱24.35	₱28.72	₱24.73
Beans and Legumes	₱46.19	₱37.89	₱42.59	₱35.43	₱58.57	₱27.98
Condiments	₱98.57	₱52.65	₱91.26	₱40.91	₱145.56	₱58.93
Livestock and Poultry Commercial	₱95.18	₱79.94	₱93.66	₱76.95	₱109.45	₱82.25
Cutflower	₱99.38	₱50.29	₱119.12	₱84.81	₱160.45	₱90.20
Livestock and Poultry Backyard	₱146.79	₱141.59	₱152.55	₱145.74	₱161.38	₱136.21
RETAIL PRICE						
Type of Commodity	Year					
	2018		2019		2020	
	HMARP	LMARP	HMARP	LMARP	HMARP	LMARP
Commercial Crops	₱25.12	₱24.52	₱24.80	₱24.60	₱26.62	₱25.14
Cereals	₱45.38	₱41.10	₱43.99	₱41.70	₱42.30	₱41.31
Fruit Vegetables	₱62.38	₱44.29	₱57.23	₱46.29	₱79.82	₱44.89

Rootcrops	₱70.60	₱51.04	₱65.80	₱51.05	₱73.55	₱57.41
Leafy Vegetables	₱113.14	₱55.80	₱80.50	₱57.58	₱105.88	₱49.88
Fruits	₱66.74	₱59.95	₱70.20	₱62.79	₱76.06	₱68.86
Beans and Legumes	₱88.34	₱76.91	₱83.85	₱77.85	₱104.61	₱80.33
Condiments	₱119.82	₱101.54	₱130.77	₱94.47	₱156.68	₱127.91
Livestock and Poultry	₱172.72	₱162.90	₱176.81	₱172.52	₱201.30	₱177.10
Fish	₱224.06	₱212.44	₱242.00	₱227.03	₱254.60	₱235.14

**HMAFP = Highest Monthly Average Farm gate Price*

**LMAFP = Lowest Monthly Average Farm gate Price*

**HMARP = Highest Monthly Average Retail Price*

**LMARP = Lowest Monthly Average Retail Price*

Price fluctuation is conventionally observed in farm and market goods. Accordingly, this study is in pursuit and is oriented towards determining the trends and dynamics of farm gate and retail prices of the types of commodities available in Luzon.

As illustrated in Figures 3, 3.1, 3.2, and Table 1, Leafy Vegetables, Fruit Vegetables, Fruits, Beans and Legumes, Condiments, Livestock and Poultry Commercial, Cutflower, and Livestock and Poultry Backyard exhibited their highest monthly average farm gate price in the year 2020. Contrary to the aforementioned agricultural commodities in Luzon, the highest monthly average farm gate price of Cereals and Commercial Crops was recorded in the year 2018, at ₱20.07 and ₱29.71, respectively. Livestock and Poultry Backyard, Cutflower, and Condiments were among the types of commodities with the highest average farm gate prices in the year 2020, with their lowest being recorded at ₱136.21 in 2020, ₱50.29 in 2018, and ₱40.91 in 2019, respectively. All the types of commodities have diminished in their farm gate prices in the year 2019, excluding Fruits, Cutflower, and Livestock and Poultry Backyard. It can be realized from the data of 2019 to 2020 that the farm gate price of all the types of commodities in Luzon have fairly incremented, with Cutflower receiving the maximum increase at ₱54 price difference, as calculated from the highest average farm gate price from the two years given.

On the subject of retail price, Cereals and Leafy Vegetables obtained their highest average retail price in the year 2018, at ₱45.38 and ₱113.14, respectively. However, the lowest average price that has been recorded for Leafy Vegetables was in 2020, with ₱49.88. Fruits, Condiments, Livestock and Poultry, and Fish were the only types of commodities with an improvement in their retail price in the year 2019. However, the rest of the types of commodities have also demonstrated a significant growth in their retail price in the year 2020. Condiments received a maximum surge in its average retail price with a price difference of ₱62 from 2019 to 2020. Cereals, on the other hand, obtained only an increment of ₱0.6 from its average price in 2019, as compared to the year 2020.

Over the past three years, the lowest average farm gate price was recorded in November 2019 at ₱14.63 for Commercial Crops, and the highest was determined in December 2020 at ₱161.38 for Livestock and Poultry Backyard. Similarly, the lowest average retail price was recorded in January 2018 at ₱24.52 for Commercial Crops, while the highest was determined in December 2020 at ₱254.60 for Fish. Commercial Crops, Cereals, and Rootcrops were among the types of commodities with the lowest average price, both for farm gate and retail. Livestock and Poultry Backyard, Cutflower, and Condiments, on the other hand, were among the types of commodities with the highest average farm gate price. Fish, Livestock and Poultry, and Condiments dominated the list on account of commodity types with the highest retail price in Luzon from 2018 to 2020.

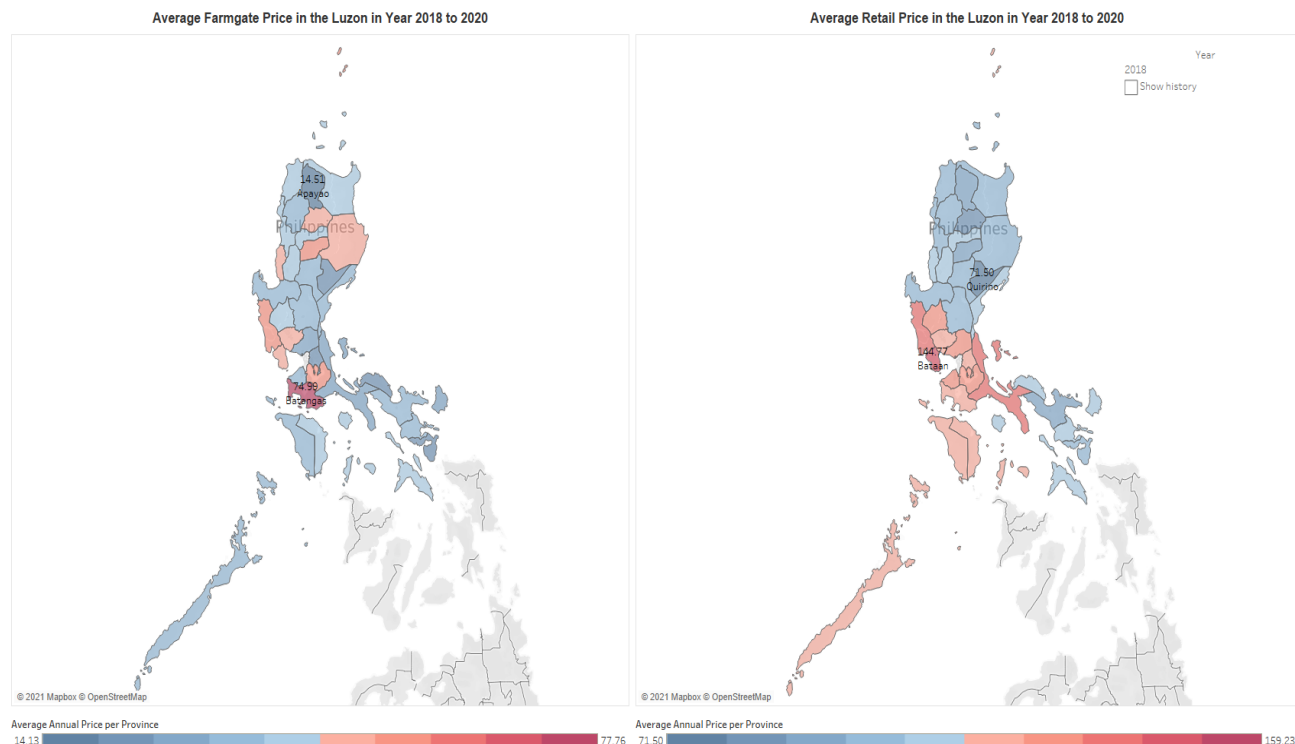


Figure 4. Annual Average Farm gate and Retail Price in Luzon Provinces (2018)

As seen in Figure 4, the provinces of Luzon were color-coded in blue to red according to their corresponding annual average price. The color legend was used to determine whether the average annual farm gate and retail price of the provinces are on the lowest or highest average of the year. The data on the farm gate prices of agricultural commodities in 2018 revealed that only 9 provinces in Luzon reached the red mark while the rest lies on the blue scale. The Province of Batangas, with an annual average farm gate price of ₱74.99 was the province with the highest average farm gate price in the year 2018. The lowest recorded was at ₱14.51 annual average farm gate price, from the Province of Apayao. With a total of 39 provinces included in the dataset, the study showed that the highest annual average retail price in Luzon in the year 2018 reached ₱144.77, as gathered from the data of the Province of Bataan. On the other hand, the lowest annual average retail price recorded for 2018 was at ₱71.50 from the data of Quirino Province.

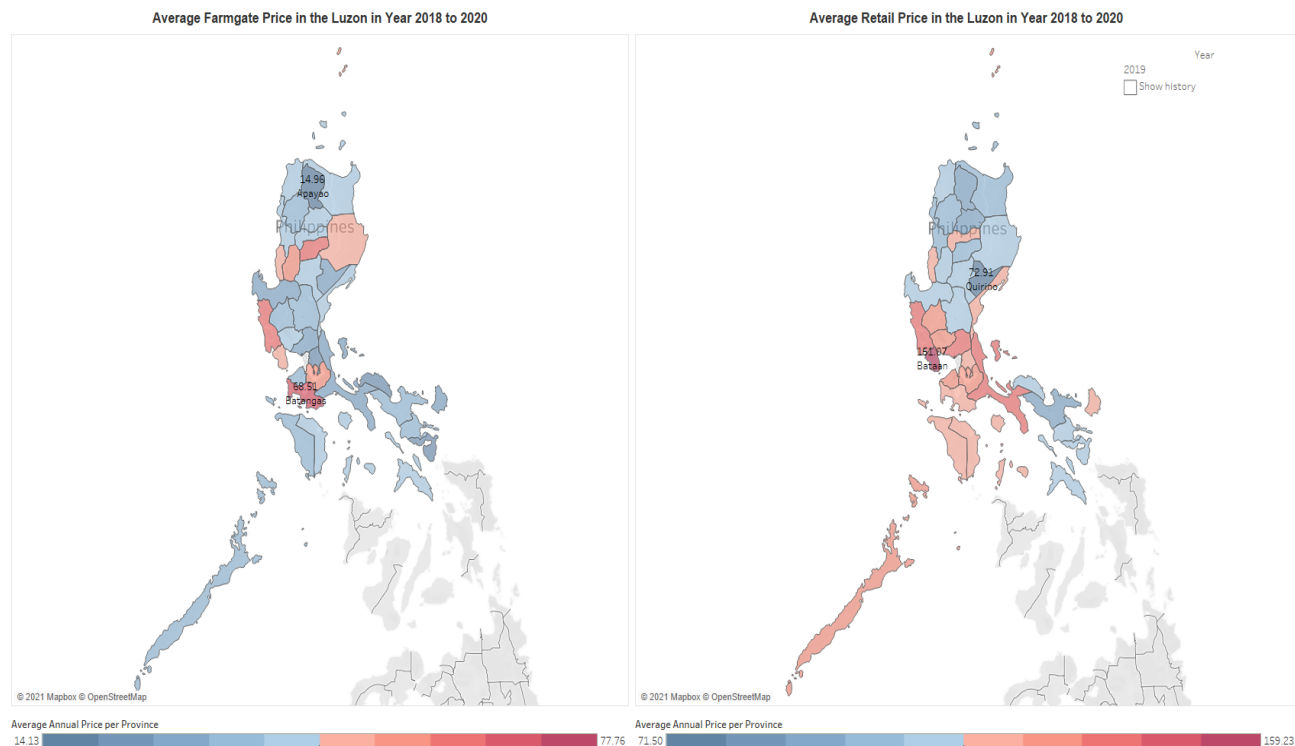


Figure 4.1 Annual Average Farm gate and Retail Price in Luzon Provinces (2019)

Using the same colors as the price status indicator in Figure 4, the study determined the highest and lowest annual average retail price in the year 2019. Within a year later, the annual average price of the agricultural commodities in Luzon had swelled. The highest annual average farm gate price recorded was at ₱68.51 in Batangas, which has deflated in comparison with the data from 2018 in Figure 4. With regards to the lowest annual farm gate price, ₱14.96 was recorded for Apayao, albeit there was an improvement in the price of its agricultural commodities. On the other hand, the Province of Bataan managed to be the province with the highest annual average retail price in Luzon with ₱151.07, while Quirino Province has improved at ₱72.91, but still recorded as the lowest annual average retail price in Luzon for the year 2019. Meanwhile, in the same year, several provinces manifested an increase in their annual average retail prices including the province of Aurora, Marinduque, La Union, and Catanduanes with ₱117.72, ₱117.79, ₱118.50, and ₱118.48 respectively.

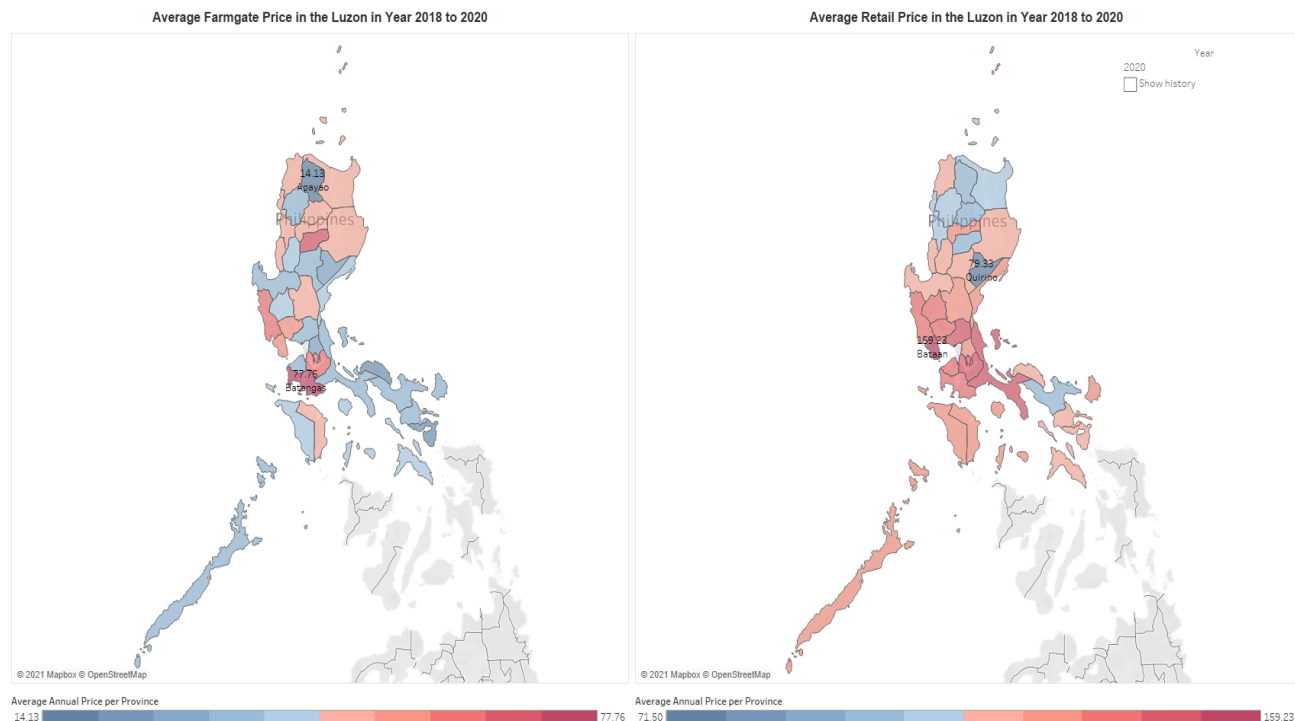


Figure 4.2 Annual Average Farm gate and Retail Price in Luzon Provinces (2020)

The annual average farm gate price in Luzon in the data of 2020 reached ₱77.6 with Batangas province securing the highest annual average farm gate price. Apayao with ₱14.43 remained as the province with the lowest average farm gate price in Luzon in the same year. The figure above (Figure 4.2) shows more provinces on the red indicator for the retail price. Over the past two years, the farm gate and retail price in the provinces of Luzon have improved, with only 8 provinces remaining on the blue color indicator (low annual average price), compared to the data in 2019 that showed 19 provinces on the blue scale. With over a half of the provinces reaching the red scale, the study on 2020 data indicates drastic improvement. As shown in the figure above, the Province of Bataan has continuously improved, reaching ₱159.23 which was the highest annual average retail price in Luzon for the past three years. With an annual average retail price of ₱79.33, the Quirino Province improved from its previous data but remained to be the province with the lowest annual average retail price in Luzon. In

addition, several provinces shifted in their prices ranging from ₱100 to ₱130. Among the provinces that showed an increase in the year 2020 are Ilocos Norte, Nueva Ecija, Pangasinan, Benguet, Isabela, Camarines Norte, Albay, Sorsogon, and Masbate.

CONCLUSION

In the course of an exhaustive research and analysis, it can be deduced that the farm gate and retail prices of most agricultural commodities in Luzon have manifested an upward growth as well as significant fluctuations over the past three consecutive years. In a span of three years, except for the first quarter of 2020, Livestock and Poultry Backyard remained as the type of commodity with the highest farm gate price, and Commercial Crops remained as the type of commodity with the lowest retail price as well as with the lowest farm gate price from the second to fourth quarter of the past three years. Fish also remained as the type of commodity with the highest retail price from 2018 to 2020. Most of the agricultural commodities including Rootcrops, Commercial Crops, Fruit Vegetables, Beans and Legumes, Condiments, Livestock and Poultry, and Fish obtained their highest average farm gate and retail price around December 2020. On the other hand, most of the lowest average retail price was obtained in the months of January and May of 2018. The Province of Batangas holds to be the province with the highest annual average farm gate price while Apayao being the lowest from 2018 to 2020. On the subject of retail price, the Province of Bataan secured the highest annual average retail price, while Quirino Province remained as the lowest.

RECOMMENDATIONS

This paper was driven by the objectives of determining the farm-to-retail price trends and dynamics of agricultural commodities in Luzon from 2018 to 2020. However, this paper may have also exhibited deficiency on grounds of dataset selection, data preparation, and visualization. Therefore, the following are the recommendations which could be of use to future researches:

- It could be suggested for the government to take initiative and implement concrete, feasible actions to efficiently and effectively manage the increasing prices of agricultural commodities
- It could also be ideal to prioritize agricultural commodities like Rootcrops and Commercial Crops as crop production plays a significant role in Philippine agriculture, most especially in Luzon
- With the limited statistical data, both on the farm gate and retail price of agricultural commodities in the OpenStat database of Philippine Statistics Authority, the estimation of the price gap could not be successfully carried through. Therefore, it could be recommended to obtain additional data from any other similar sources or databases like National Food Authority

REFERENCES

- CIDA-LGSP (Canadian International Development Agency-Philippines-Canada Local Government Support Program). 2003. Re-Envisioning Local Agricultural Development: A Guide for Development Managers.
- DA Communications Group. (2020, December 30). 2020 Year-end Report. Official Portal of the Department of Agriculture. <https://www.da.gov.ph/2020-year-end-report/>
- Giles, J., Macandog, P.B., Nowak, A., Pablo, J., Sebian Jr, B., Palao, L.K., Balanza, J.G., Hildebrand, J., and Grosjean, G. (2019) Climate-Resilient Agriculture in The Philippines: Climate Risk Profile, Luzon. International Center for Tropical Agriculture (CIAT); Department of Agriculture - Adaptation and Mitigation Initiative in Agriculture, Government of the Philippines; The Food and Agriculture Organization of the United Nations (FAO). Manila, Philippines. 32 p.
- Philippine Statistics Authority. (n.d.-a). Farmgate Prices (New Series). OpenSTAT | Philippine Statistics Authority. https://openstat.psa.gov.ph/PXWeb/pxweb/en/DB/DB__2M__NFG/?tablelist=true
- Philippine Statistics Authority. (n.d.). Retail Prices (New Series). OpenSTAT | Philippine Statistics Authority. https://openstat.psa.gov.ph/PXWeb/pxweb/en/DB/DB__2M__NRP/?tablelist=true
- Russo, Carlo & Goodhue, Rachael. (2017). Farmgate prices, retail prices, and supermarkets' pricing decisions: An integrated approach. Agribusiness. 34. 10.1002/agr.21530.

Senate of the Philippines, Office of the Secretary. (2016, June 3). AN ACT TO PROMOTE FARMER AND FISHERFOLK ENTERPRENEURSHIP AND DEVELOPMENT TO BE KNOWN AS “ SAGIP SAKA ACT OF 2016.” Senate of the Philippines.
<http://legacy.senate.gov.ph/lisdata/2346320047!.pdf>

Statista. (2021, October 26). Agriculture in the Philippines - statistics & facts.
https://www.statista.com/topics/5744/agriculture-industry-in-the-philippines/#topicHeader__wrapper