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**RESEARCH ARTICLE**

**Trade Liberalization: Reaping Its Effects on the Agricultural Performance of the Philippines**

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**ABSTRACT**

Over the years, economists had been taught that "*Trade can make everyone better off*", thus the rationale of the dynamic shift in the Philippine agricultural trade system from protectionism to trade liberalization. It was known that the Philippines was one of the champions in the agriculture sector as it had massively produced agricultural goods and exports during the late 20th century. However, various studies and reports have shown and concluded that agriculture in the Philippine setting is now dubbed as the "poor man's sector". In this study, it has reaped the reality of the country's stance in trade agreements as it has examined the correlation of trade openness, imports of goods, and employment to the Value of Production in Agriculture—wherein, it has resulted in distinct conclusions such as (1) trade openness has a negative impact to VPA, (2) imports of goods increase VPA by 0.094373, and (3) employment's positive impact is estimated to be at 4570.708. The researchers suggest that such results and analysis are vital for the government sector and thus revisit the pros and cons of trade policies and weigh their net effects on the agricultural sector to which people owe their daily nutrition.

**KEYWORDS**

Trade Liberalization, Agriculture Performance, Imports, Exports, Trade Openness, Philippines, Employment in Trade

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**1. Introduction**

**1.1 Background of the study**

Trade is one of the essential components in sustaining and driving an economy. In fact, the fifth principle in studying microeconomics, "*Trade can make everyone better off*," highlights the importance of this economic activity. Rather than being self-sufficient, a country, like the Philippines, can effectively meet its needs and wants by engaging in international trade in goods and services with other countries (Mankiw, 2015). According to Moncayo (2015), different global trade agreements brought forth by globalization have helped the country grow and develop. Germany has increased employment and exports as a result of several open market operations. Their economy has grown as a result of foreign direct investment, particularly in terms of employment. As a developing country, the Philippines often follows and implements economic policies that align with the vision and programs of ASEAN regions, such as liberalizing free trade, putting up barriers to goods exports and imports, reverting tariffs, and the like. Global markets provided opportunities, and these approaches have been critical in fostering economic growth, competitiveness, and efficiency while benefiting the economy's various sectors.

In line with this, the Philippines has entered a number of trade treaties to be able to establish relations with other countries. Investments have also been critical in subsequent trades with foreign nations and domestic market transactions. These activities, however, have bilateral implications on the Philippine economy's foreign and domestic sectors. Trade liberalization, for instance, improved the relaxed atmosphere of foreign trade, such as the importation or exportation of products from various sectors of the economy, especially agriculture and manufacturing.

In both the foreign and domestic markets, the role of new policies encouraging a free market performed a prudential function. One of the keys to developing economic growth in the country, such as generating jobs and minimizing the pay disparity, is the

trade and investment agreements that the government has agreed to and constructed. In a study, Santos (2011) indicated that trade liberalization is one of the resolutions to increase productivity in the Philippines, hoping to encourage productivity, development and alleviate poverty and pay disparity. In the Philippines, trade liberalization is deeply rooted in the failures of trade protectionism and import substitution. However, as a developing nation, the Philippines still has concerns and questions regarding the implications of trade liberalization.

The Philippines was then one of the agricultural champions in the late 20<sup>th</sup> century, with its agricultural revenue accounting for 31.06 percent of the country's GDP in 1974. However, it has become one of today's worst sectors in terms of contribution to national income due to lack of innovation and conflicting trade policy reforms. The sector has been steadily falling over time, and in 2019, it accounted for a significantly lower 8.82 percent of the country's total GDP (Global Economy, 2019). Due to a lack of savings, credit, and insurance, almost all agricultural labourers in the Philippines live in poverty. To secure social security for these people, long-term strategies to boost agricultural production and welfare are deemed necessary. As a result, the agricultural industry in the Philippines is now known as the "poor man's sector".

In research by Mangabat (1999), it was discovered that many trade liberalization implications and policies, such as quantitative restrictions on imports, import substitution policies, currency rate, and other trade policies, impaired the Philippines' competitive advantage in the agricultural sector. Moreover, these policies led to a decline in the agricultural sector's share of GDP in the Philippines. Furthermore, several studies and pieces of literature have attempted to investigate the consequences, components, growth, and process of trade liberalization, especially in the agricultural sector, which has gained prominence. Previous researchers have identified the living predicament within the trade sector, especially the current trade deficit in agriculture and trade. The researchers discovered a discrepancy between the theoretical analysis that easing trade barriers would help a country's resource allocation and contribute to its overall growth. This prompts the researchers to determine whether trade liberalization will revive agriculture's vibrant trend. It has investigated and analyzed the latent component and implications of trade liberalization in the agriculture sector using nonexperimental research.

### **1.2 Statement of the Problem**

The advancements of various ASEAN regions and developed countries have influenced and advanced Philippine trade. To transition from trade restrictions to trade liberalization, various agreements from both within and outside the country are required. Mangabat (1998) revealed a deficiency in the Philippines' protectionism legislation or limitations to safeguard domestic farmers from the effects of complete trade liberalization. According to data from the International Labour Organization (ILO) from 2000 to 2017, the Philippines still has a trade imbalance while having a moderate influence on growth and causes of export advancement in the trade sector. As a result, the following questions were addressed in this study:

1. Do imports of goods increase the value of production in agriculture of the Philippines?
2. Does trade openness increase the value of production in agriculture in the Philippines?
3. Does employment in trade increase the value of production in agriculture of the Philippines?

### **1.3 Theoretical Framework**

The theories presented herein are aimed to either support or oppose trade liberalization and free trade. The following theories have shown the effects of trade liberalization on agricultural production in the Philippines:

The New Trade Theory (Krugman, 1979) addressed the economy's relative openness to trade, notably in agriculture. It had stated that if a jurisdiction has large economies of scale and growing returns to specialization in a specific sector, worldwide demand for goods and services may benefit just one or a few businesses. Furthermore, protectionism policies arise to shield the domestic market and the emerging industry from the avalanche of the dominant global or international market that enters a country.

According to Miljkovic and Shaik (2010), the new trade theory argues about the economies of scale, and due to the improvement and increasing return to scale, some firms became less profitable or productive. This affects the technical efficiency of firms in a certain sector, such as the agriculture sector. The researchers found that trade openness along with an increase in trade protectionism made a positive impact on the technical efficiency of the agriculture sector, although it lowered agricultural imports in the U.S.

On the other hand, the Ricardian Model asserts that the comparative advantage, especially the differences in labor productivity due to technological disparities, makes countries trade with one another to benefit and attain efficiency. According to Cheng and Qiu (2003), the theory captures the ramifications of trade liberalization or openness in a variety of ways, including transactions between countries, including multinational corporations' Foreign Direct Investments. According to the report, many countries provide investment or move their manufacturing to other countries with low-cost labor and technology to operate their transactions and production. The researchers have discovered that under this model, total jobs in the domestic country decrease as a result of the productivity brought on by technology and job or output relocation.

Anowor et al. (2013) have also used the Ricardian model in their study, including the Comparative Advantage Theory and Heckscher-Ohlin Model. Both the Ricardian model and Heckscher-Ohlin Model capture the essence of the comparative advantage. The Heckscher-Ohlin Model asserts that a country's resources or factors of production, such as labor and capital endowment, lead to international trading because of resource disparities and endowment. In line with this, countries will be able to become more competitive and productive, enabling profits to be transferred or circulated, so countries that are short on a specific product or raw material will prefer to buy products from other countries. However, if a nation has an abundance of products or resources, it can opt to export certain goods or resources. Furthermore, both models overlook the influence, impact, and implications of technological advances on trade.

The objective of this research is to look at the relationship between the Value of Production in Agriculture and trade openness, including imports of goods, and employment (trade), to capture the effects of trade liberalization on the agriculture sector using these independent variables backed by the three theories (New Trade Theory, Heckscher-Ohlin Theory, and Ricardian Model). These hypotheses support the study on the effects and ramifications of trade liberalization on Philippine agriculture. The theories also backed claims regarding trade liberalization, such as the idea that if a nation has enough labor and technology, it can increase its productivity (Heckscher-Ohlin). Countries trade with one another to achieve benefits and productivity as a result of trade liberalization. These theories also featured analysis about countries with increased exports having a trade deficit, especially if they are undergoing technological disparities—which heightens the agricultural trade environment competitiveness. However, it is still debatable if trade liberalization is appropriate for developing countries that are undergoing trade disruptions.

The Heckscher-Ohlin theory, which notes that trade liberalization would minimize income gaps between developing countries with a large number of low-skilled and unskilled workers, is applicable in the Philippine setting. "*Import protection as export promotion*," according to the New Trade Theory, is a paradigm in which protectionist policies help domestic markets raise profits while lowering marginal costs. As a response, it demonstrates the importance of trade barriers and domestic market security.

#### **1.4 Conceptual Framework**

This section provides both graphical and narrative descriptions of the linkage between the independent variables to the dependent variable.

The dependent variable is the Value of Production in Agriculture or VPA. It captures the overall contribution of agriculture to the overall agricultural performance to determine the effects of trade liberalization on agricultural production, trade openness, imports of goods, and employment in the trade sector were used as independent variables. The secondary data are gathered from the Philippine Statistics Authority and are taken by their growth rates in constant 2018 prices which allows the proponents to capture their real-time significance, except for employment in trade.

The 'processing' phase of the IPO framework captures how inputs are going to be translated into output by narrating how the variables are going to interact and reveal their significance in the study. The statistical tool to be used is multiple regression analysis which will be performed through *Eviews* (student version).

It is important to mention that diagnostic tests such as the Jarque-Bera, Breusch-Pagan Test, Variance Inflation Factor, and the Ramsey RESET test will be utilized to screen if the model has satisfied the assumptions of multiple regression and present possible treatments. And Microsoft Excel has been used to compute the value of trade openness.

The output phase of the conceptual framework outlines the results from the regression analysis, which will determine if the researchers should reject the null hypothesis or not and arrive at a carefully evaluated conclusion of how trade liberalization affects the agricultural performance of the Philippines.

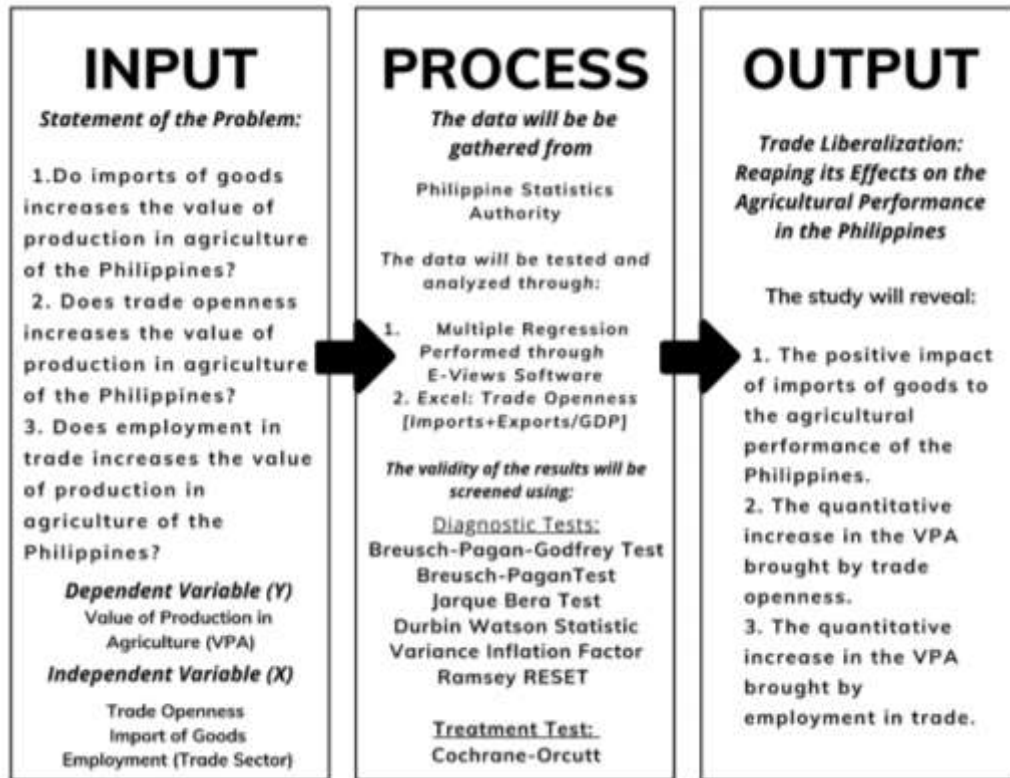


Figure 1: Conceptual Framework

**1.5 Hypotheses**

The proponents of this study assumed that Trade Liberalization given by the parameters such as Imports of Goods, Trade Openness, and Employment are positive determinants that have a significant relationship with Agricultural Performance--- represented by the Value of Production in Agriculture. The decision requires whether or not to reject the null hypothesis based on a level of significance of 0.05.

1. **Null Hypothesis  $H_0$**  ( $p = >0.05$ )

There is no significant relationship between Imports of Goods and Value of Production in Agriculture of the Philippines.

2. **Null Hypothesis  $H_0$**  ( $p = >0.05$ )

There is no significant relationship between Trade Openness and the Value of Production in Agriculture in the Philippines.

3. **Null Hypothesis  $H_0$**  ( $p = >0.05$ )

There is no significant relationship between the Employment (Trade) and Value of Production in Agriculture of the Philippines.

**1.6 Assumptions**

Rice production efficiency is required to support the increasing populations of the developing world, which includes the Philippines, as rice is a staple food for marginalized households (Ladha J.K. et al., 1993). Using the concept of trade liberalization, the Philippines hopes that domestic entrepreneurs will be forced to compete with foreign partners' imported goods, resulting in the more sustainable production of all goods and services. This causes domestic prices to become more competitive with global prices, resulting in better agricultural performance (Malaluan, 2011). The neoclassical counterrevolutionary theory of economic growth and development proposes that a less controlled free market performs better than one that is heavily dependent on government interference (Todaro, 2015). Thus, if we adjust to trade liberalization, we are more likely to see economic development in the Philippines through increased agricultural performance. The international literature is only used to construct the central basis of the research goal, and this analysis only focuses on the background of the Philippines.

### 1.7 Scope and Delimitations

The aim of this research is to better understand the main effects of trade liberalization on domestic agriculture, especially in terms of employment and production. The proponents produced a study that encapsulates what the Philippines can acquire from welcoming a more open trade system. This also gave an understanding of the underlying factors why the Philippines, a country that is originally rich in agriculture, has become one of the worst-performing countries in terms of agricultural exportation.

The study covered and focused on the quarterly operation of Value of Production in Agriculture of the Philippines, including the analysis of trade openness (Exports + Imports/GDP), imports of goods, and Employment in trade from the year 2000 to 2019. The relationship between the three explanatory variables and the Value of production of the Philippine Agriculture in constant 2018 price, which measures the real-time valuation of transactions adjusted for inflation, as the dependent variable, is the focus of this study. Note that Imports of Goods, Trade Openness and Value of Production in Agriculture are at constant 2018 prices, and Employment in trade is at 2016=100. It is pointed out that the proponents have considered including the Foreign Direct Investment, Exchange rate, and Exports of Goods as independent variables; however, publicly available data for these are not complete and thus insufficient to capture the research aim. The researchers have determined if a variation in one variable influences the others to determine the underlying factors and how they will affect the main topic of this research that contributes to the performance of Philippine Agriculture.

Data gathered in making this study were from the available secondary data such as those provided by the Philippine Statistics Authority, which was collated by the researchers. The researchers have further opted in using employment in the trade sector that summarizes aggregate measurement across all sectors.

Lastly, the data are obtained from the Philippine Statistics Authority (PSA) through Open Stats and were examined through multiple regression analysis in *Eviews* software (student version). This has allowed the researchers to determine the strength of the relationship between the variables and come up with a preliminary conclusion. It is of importance to validate the results of the regression analysis, which is the objective of using diagnostic tests performed in the same software. Since this study examines agriculture as a whole, trend discussions are expected to be general. To prevent multicollinearity, which may further skew the findings, an extensive study for the subsectors of agriculture is omitted, and therefore variables for these are not included in the research's boundaries. In addition, the report will assess past and current policies that continue to affect agriculture's fate. To give readers a forward-looking perspective, the challenges and opportunities in the sector are also listed.

### 1.8 Significance of the Study

The result of the study will make a positive contribution to the following sets of individuals:

*To the students* who are interested in determining how trade liberalization has influenced agricultural production in their future articles. The aim of this research is to serve as a literary resource for both economics and non-economics students.

*To future researchers*, the study would be useful, whether they are students or freelancers, who will be undertaking a study that is applicable to discovering the consequences of opening the Philippine economy to welcome a new trade framework.

*To the national economists* as it will help in bridging the gap between trade and its repercussions on the Philippine economy.

*To the entrepreneurs*, who are the ones affected by policy implementation. This research strives to be a literary aid to the burgeoning issue of business exchange and to assist entrepreneurs in their decision-making in order to maximize profit.

*To the policymakers and concerned agencies*, wherein it is worth learning that improving the standard of trade is contingent on the policies that are being implemented. Consumer demand and supplier expenditure, and efficiency are all influenced by policies. The Philippines has a rich history of trade policies, as the failure of trade protectionism in the 1950s and 1970s affected trade liberalization policies.

*To the Labor Unions*, which are concerned in employment concerns. The defense of domestic workers is one of the reasons for trade protectionism. As previously stated, policy changes have a significant impact on companies. Low-wage workers, on the other hand, are particularly affected. Therefore, the study's primary concern is the job security of our local farmers and other domestic workers, who are directly affected by trade liberalization and whose livelihoods and families are at risk.

*To the Philippine government and its agencies, such as the Department of Agriculture*, to which enhancing the country's national trade climate is their responsibility. As this research would cover the effects of trade liberalization, it will relatively give the government an ability to understand the impact of government interference from the findings and data of this research.

## **2. Literature Review**

### **2.1 Trade in the Philippines**

The Philippines' trade has gone a long way since its independence in 1946, and it is being more open in the global market, albeit with mixed results, Briones (2020). As part of the study into the rich history of Philippine trade policies and their consequences, it was discovered that in response to the country's balance of payment crisis in the late 1940s, the Philippines implemented an import substitution industrialization program that resulted in a fixed exchange rate. Despite the peso's overvaluation, it resulted in the artificial restriction of import licenses and foreign exchange to promote manufactured consumer goods. As a result, in the 1970s, the country grew more protective of local businesses, implementing the highest average tariff in Southeast Asia and imposing quantitative limits on nearly 52 percent of imported goods (QR). Furthermore, by enabling exemptions to trade exporters, the RA 6135, also known as the Export Incentives Act of 1970, served as an "export bias policy" aimed at accelerating economic development. As a result of the country's World Bank Structural Adjustment Loan (SAL), the Tariff Reform Program (TRP) and Import Liberalization Program (ILP) were launched in the 1980s, which shifted the country's trade policy. Export taxes and monopolies were abolished, ERPs and tariff rates were reduced, the QR on imports was lifted, and fertilization and wheat imports were liberalized. The end of the former President Ferdinand Marcos' regime and the beginning of more successful trade involvement occurred in 1986, where agricultural goods were liberalized by lifting tariff restrictions on agro-food imports. This also allowed for the emergence of a free market economy in the Philippines, as the National Food Authority (NFA) and Sugar Trading Corporation's capacity to interfere was reduced. However, it was not long before the agricultural sector suffered the consequences of this abrupt transition to liberalization, which is why a policy was drafted to protect domestic farmers by imposing import restrictions to protect domestic production from the disruptive entry of foreign rivals, which became known as the Magna Carta for Small Farmers in 1991 (Briones, 2020).

The second phase of TRP was implemented in the early 1990s under Executive Order (EO) 470, which lowered tariffs for five consecutive years. QRs were translated into equivalent tariffs to promote trade reform initiatives under Ramos' EO 470 and EO 8. ASEAN Free Trade Area (AFTA) with countries such as Australia, New Zealand, Japan, and South Korea, Philippines-Japan Economic Partnership Agreement (PJEPA), World Trade Organization, and European Free Trade Area (EFTA) were among the international trade agreements with which the country has affiliated with (Briones, 2020).

### **2.2 An Overview of Philippine Agriculture**

The agricultural sector is divided into four sub-sectors: farming, fishing, livestock, and forestry. Contrary to common belief, the agricultural sector generates a significant portion of the Philippines' income. Nevertheless, the World Bank (2020) has issued a comprehensive report that outlines the sector's declines over time. It was recorded that the country's Total Factor Productivity (TFP), a ratio of the output to its inputs, is strongly linked to agricultural crop patterns, with a 32% rise in the last two decades. This, however, is significantly lower than its neighbouring South-East Asian countries such as Indonesia, Thailand, and Vietnam, which had TFP of 50%, 67%, and 73% respectively within the same periods.

#### **2.2.1 Agriculture: From boom to bust**

From 1940 to 1950, agricultural productivity was high, and the country was one of the largest exporters of rice and other agricultural commodities (Briones, 2020). However, trade policies and global economic patterns have altered the Philippines' agricultural fate. Fast forward to the 21st century, trade deficits in the agricultural sector have steadily widened as imports increased exponentially from USD 3.1 billion to USD 13.7 billion between 2001 and 2018, indicating that they have been growing faster than exports (with 3.6 percent annual growth), indicating a trade deficit.

In recent years, the country's export earnings have also declined. In 2001, neighbouring countries such as Indonesia exported 3.6 times more than the Philippines, and Vietnam exported 2.2 times more. The country's agricultural export patterns revealed that it did not rise to the same degree of competitiveness as its neighboring countries like Indonesia, which sold seven times more, and Vietnam, which sold five times more than the Philippines in 2018 (Briones, 2020).

The measure of the Revealed Comparative Advantage (RCA) of coconut oil, the main commodity to which the Philippines is said to be a top exporter, has an average growth rate of about 3% that ran only within 2001 and 2017. This aggravates the issue of agricultural export growth stagnation during the said period. Imports of agricultural products such as wheat (up 7%) and rice (up 11%) have, on the other hand, increased exponentially in 2019. Despite high tariffs, the Philippines has been a major importer of rice commodities (Briones, 2020).

The agricultural sector's gross value added as a percentage of GDP captures its overall contribution to the national economy, and in recent years, the sector has grown at a slower pace than the industrial and service sectors. In fact, according to the PSA's comprehensive report on the economic performance of the country's GDP in 2020, Agriculture, Forestry, and Fishing (AFF) experienced a 2.5 percent decline in the fourth quarter of 2020 and a 0.2 percent overall full-year decline (PSA, 2020). This deceleration of growth is related to farmers' low productivity, which can be due to a variety of factors, including trade.

### 2.2.2 Challenges that hinder productivity

Brown E. et al. (2018) presented a summary of the country's agricultural sector challenges from previous years, which include climate change, inefficiency in the irrigation system, lower productivity, and, most importantly, investment in technology.

#### 1. **Climate Change**

The Philippines ranked third out of 173 countries in the disaster risk index due to persistent floods, drought, soil degradation caused by chemical fertilizers, and the emergence of pest-borne diseases. Briones (2017), for instance, conducted a study that demonstrated that fertilizer has a significant impact on agricultural productivity. However, he also noted that there had been a decline in domestic fertilizer production, forcing farmers to switch to imported fertilizers, resulting in a rise in agricultural input production.

Similar to other policies, the Rice Tariffication Law (RTL) has two sides, which can be explained as follows: It reduced agricultural workers' wages but immediately increased government revenue. Since more international commodities entail less demand for domestic production, the repeal of QR and replacement with tariffs have had an impact on domestic farmer productivity. The government, on the other hand, claims that the RTL was adopted to promote productivity through more competition and to use the revenue earned by the policy to finance modernization and R&D. There is still much to be achieved in terms of modernizing agricultural production through technological investments. It is anticipated that RCEF will efficiently allocate its additional resources from the RTL share of revenue, apportioning 30% to the PHilMech for rice farm equipment (Balie et al., 2020).

According to Rosegrant et al. (2016), the economic casualty or damage of climate change on the Philippines' agriculture sector is expected to be about 145 billion pesos per year by the end of 2050. They also indicated that if the government abandons its current rice subsidy strategy, the effects of climate change would have a significant impact on the agriculture sector. Furthermore, through investments and R&D, it is very likely to increase agricultural productivity, particularly in rice production. They also discussed that assisting farmers in agricultural decision-making, developing a system to promptly notify them of weather information, investing in technology, and assisting them in promoting innovative farming practices and technologies are some of the ideas that can help farmers be more productive and efficient. As a result, farmers will adapt to the changes brought on by trade liberalization and climate change, allowing the Philippines to maintain food security. Farmers will be able to respond to the changes brought on by trade liberalization and climate change, over the course, enabling the Philippines to sustain food security.

#### 2. **Inefficient Irrigation Program**

Barker and Inocencio (2018) examined the inefficiency of the irrigation system in the agricultural sector, which leads to a slowing of development. Furthermore, the study concluded that the uncertainty of climate change and water resource protection could be overcome through thorough assessment, which requires good funding execution and the implementation of sound policies. Finally, it has made key suggestions for how to strengthen the irrigation system, including Alternate Wetting and Drying, Canal Lining, Reallocating Water to Higher Value Uses, and Crop Diversification.

#### 3. **R&D Skimping**

One of the most crucial matters in the agricultural sector is a lack of adequate funding for research and development. Brown et al. (2018) discovered in a study that the Philippines' share of R&D investment was only at 0.3 percent last year, far below the World Bank's recommendation of at least 3 percent of a country's annual GDP.

#### 4. **Geographical Location**

Almost every Filipino holds the notion that the Philippines is an agricultural country, yet its geographical location, as well as its vulnerability to typhoons and natural calamities, have proven this to be fallacious. In fact, Blanc and Strobl (2016) found that using a panel spatial regression model, typhoons reduce local production in provinces, accumulating a loss of 12.5 million tons since 2001. This information also demonstrates why the country is vulnerable to agricultural importation.

### 2.3 Applications and Implications of Trade Liberalization

#### 2.3.1 *An overview regarding trade liberalization's implication on the whole trade sector/economy*

In the Pakistani setting, Iqbal et al. (2018) revealed in their study that one of the goals of trade liberalization, particularly in agriculture, did not quickly change the country's dilemma about wage inequality and was ineffective in reducing poverty. Despite this, trade policies in agriculture under trade liberalization have contributed significantly to the growth of Pakistan's economy. Furthermore, the liberalization policy is proposed in their analysis to serve as a way of ensuring long-term economic growth and household welfare by derived factors in the industrial sector, rather than reducing wage inequalities and poverty. Mitra (2016), on the other hand, listed some of the benefits and drawbacks of trade liberalization to minimize poverty. The study also emphasizes the significance of "effective" trade and poverty-reduction policies for trade reforms to reap notable advantages such as: diversifying away from commodities with sharply falling world prices, specializing based on a country's competitive advantage,

fostering financial development, upholding property rights, and building critical infrastructure, and plenty of similar things. The study also discovered that trade liberalization had a lower effect on achieving its goals, such as poverty reduction, specifically in India and other economically-deprived countries.

Similarly, trade openness has been a critical factor in spurring economic growth by increased productivity. Muhammad et al. (2019) demonstrated using econometric techniques that TO has a major effect on industry and agriculture, with an improvement of TO resulting in 0.24 and 0.042 percent increases in both industries, respectively. Using the Heckscher Ohlin Model, it was discovered that TO has a beneficial influence on jobs in these sectors due to the relatively low cost of labor. However, the services sector in developing economies had a negative impact, with a 0.05 percent decrease for every rise in TO. However, as mentioned in the introduction, the average farmer's wage is only at PHP 331.10.

According to Bakari and Tiba (2019), trade openness generates favorable externalities for Asia's tiger club economies. The described spillover effects are advancements in technology, finance, human resources, and rising market size. Using a fixed-effect model, however, the researchers found that an increase in foreign direct investment and exports reduced economic growth by - 0.05, while domestic investments are seen to be a positive contributor to the dependent variable—as its positive response for every unit increase is 0.70 percent.

### *2.3.2 Applications of the theories of trade*

Vu, D. C. (2016) included in their study the induced effects of international trade on the employment sector of Vietnam as a transmission channel to capture the influence of trade liberalization on agriculture. The study stated that employment itself has no direct correlation with trade liberalization. Furthermore, the Heckscher-Ohlin Theory asserted that freer trade would lead a developing country to specialize in a sector production that intensively utilizes its unskilled labor. Consequently, it will boost labor demand in the sector after a while, based on the assumption that developing countries are endowed with unskilled labor while skilled labor is limited. This position leads the researchers to a hypothesis that employment itself, as an effect of trade liberalization, can increase employment in the trade sector, and it can positively influence the value of production in the agriculture sector.

The Ricardian Theory of trade has helped economists from previous literature to have an outlook of trade with labor differences as the sole factor of production. Abubakar (2018) utilized this theory to explain the supply deficit of countries with inefficient agricultural productivity, which is filled by countries with a surplus in agricultural commodities. (Abubakar 2018, as cited in Krugman et al., 2012), provided two methods to understand the gains of trade using the Ricardian Theory, which are: indirect production which increases overall supply, and improvements of consumption as consumers are now given a variety of choices to choose from. Despite these gains, the author has cited the work of Briones (2017) to emphasize that the agriculture sector in the country is still losing rather than winning. Evidence such as declining farm wages and output per farmer, which is at 2.5% in 1997-2008 to 0.7% in 2009-2014, have been given. The link between poverty and productivity is evident in agriculture as 2012 data shows that out of the 24.8 million poor Filipinos, 19.3 are from the rural areas, which mainly utilize agriculture as their livelihood (Abubakar, 2018). Thus, it presents a research gap of determining how poverty can be alleviated through employment opportunities in increased productivity within the sector. The application of Ricardian Theory has been examined by the researchers and has concluded that it significantly affects supply. The 2008 scenario of the country in international trade proved that reducing tariffs have caused to decrease in domestic prices as it increased imports and filled the supply deficit, which then aided hunger to millions of Filipinos (Abubakar, 2018).

### *2.3.3 A review about trade liberalization implications on the agriculture sector*

Ji, Xianbai, et al. (2018) conducted a study on ASEAN and APEC member countries' trade policy options, categorizing the differences in the implementation of various agreements such as the TPP, CPTPP, RCEP, FTAAP, and FTAAP+. The Philippines entered into bilateral free trade agreements with other countries to achieve mutual gain economic cooperation, maintain economic development, and consolidate the competitiveness of domestic goods and services prices. They described APEC members' involvement in various regional trade policies and open regionalism as "more is merrier" and "more open is better."

However, the researchers discovered in their analysis that for developing or low-income countries that adopt the FTA policy, trade liberalization brought about by the agreements would create uncertainties for them because the strategy can have insufficient effects because it needs a large and extensive use of resources. It manifests that these inadequate impacts may create uncertainties for low-income and resource-constrained countries, which may also have an effect on other sectors of an economy such as service, manufacturing, and agriculture. Furthermore, as part of FTAs and other agreements such as the RCEP, countries such as Japan, Korea, China, Malaysia, Indonesia, and the Philippines are expected to be prepared for the tariff impacts that tariff elimination may bring. They also said that these countries expressed a willingness to open their domestic industries to associated countries.



Anderson (2017) described agricultural trade openness as compliance to meet an economy's basic human needs. In accordance with this, countries participating in the WTO and other organizations adopted policies such as lowering import restrictions, especially in agriculture. It is also a means for associated countries to investigate agricultural trade openness in order to improve economic growth while ensuring long-term food stability in all regions. Trade openness will also provide opportunities for farmers to export domestic products to the foreign market, which can boost agricultural growth and productivity.

Moreover, the researcher characterized the Philippines and Indonesia as countries that immensely engage and commit to reducing import restrictions as part of GTAP trade liberalization, especially in rice production. As a result, rice and other agricultural products from associated regions can be easily exported to a country with reduced tariffs, such as the Philippines. Furthermore, Briones (2020) concluded in his report that trade openness and weakened tariff barriers significantly led to the vast increase in agricultural imports within the Philippines rather than agricultural exports to the international market.

In their research, Perez and Pradesha (2019) highlighted the Philippine government's enacted regulation, the quantitative restriction (QR) on rice import, which has been a longstanding device of the country that controls rice imports to protect rice farmers while promoting the country's search for rice self-sufficiency. Furthermore, the quantitative restrictions (QR) were abolished and replaced with import tariffs in February 2019 with the enactment of Republic Act No. 11203 or the Philippine rice trade liberalization law.

As an agricultural region, the Philippines experienced rapid growth in imports as a result of the economic impact that trade liberalization brought. Furthermore, Laiprakobsup (2019) introduced the Philippines, which continues to be a country that imports a large number of agricultural goods, especially rice. The massive importation of agricultural products has a negative impact on the agricultural sector's farmers' competence and productivity in the domestic market. Furthermore, the government's response to this issue represents the situation's other underlying factors.

Perez and Pradesha (2019) distinguished the effects of the Philippines' trade liberalization on the rice sector. They recognized the volatility of rice prices in the domestic market, one of which is that farmgate prices of rice, or prices of rice sold directly by farmers in the domestic market, are 23 percent higher than imported rice from countries like Thailand, from 2000 to 2018. Although the government quietly protects local farmers from the avalanche impacts of trade liberalization and other imported agricultural goods by imposing quantitative restrictions or QR on rice imports, domestic consumers often suffer from higher prices of rice sold and produced by local farmers.

The enactment of the Rice Tariffication Law, which has relaxed trade barriers on import restrictions and raised tariffs on foreign rice, is one of the most pressing issues in the agricultural sector. Balie et al. (2020) learned that amending the RTL has distinct effects since opening the agricultural market to more international competitors influences both domestic and global prices. For example, it was discovered that prices in the domestic market for both consumers and producers had decreased, which benefited urban households who primarily consume rice as a staple food but resulted in a decrease in farmer income. It also offered a perspective through which to see that this reform is on the side of the poor, as it has been discovered that it positively affects poverty while causing no major changes in consumption behaviour in rich households. Despite these positive outcomes, it is vital to stress that farmers are losing out as a result of this change, as their domestic income is decreasing. Economists and other scholars have raised worry about the long-term repercussions of import liberalization and the loss of the NFA's licensing authority. Not only did it eliminate the interference given to protect the interests of both consumers and sellers, but it also sends a message that the principle of "the market will take care of itself" is being put into practice, with Philippine agriculture serving as the test case.

From the international perspective, Vu, D. C. (2016) examined the agricultural production of Vietnam, the largest contributor and exporter of rice to various countries, including the Philippines. The researcher was able to identify the latent predicaments of trade liberalization, such as the unobserved welfare effects of it on farmers, which other researchers often overlooked. These results fill methodological and conceptual holes in some agricultural trade liberalization literature. Further, according to Vu, D. C. (2016), despite being the world's largest rice exporter, Vietnam is still experiencing shocks to the welfare of agricultural workers as a result of trade liberalization. Due to constraints such as a lack of resources, credit access, or investment in storage technology, frontline traders, rather than farmers in the agriculture sector, have fully capitalized on Vietnam's recent remarkable rise in rice export volumes and prices.

Using a root and cointegration test, Keho (2017) found that trade openness increases economic growth by 0.15 percent in Cote d'Ivoire. Trade openness has been a progressive topic of global discussions, and research on the subject has yielded mixed results over time. Despite the fact that the opening of the economy is intended to promote technological advances and increase efficiency,

studies such as those by (Hausman, Hwang, and Rodrik, 2007, as cited in Keho, 2017) have concluded that trade openness can be detrimental to economies producing low-quality products.

Another finding is that the influence of trade liberalization on household welfare has been distributed primarily in two ways: first, through household income sources such as incomes, employment, and agricultural product sales, and second, through the price of their consumption package and expenses.

#### ***2.4 The agriculture sector in today's time***

Evans (2019) presented in research the history of agricultural product demand and use from around the world, from wartime to the present. It demonstrated how, as the world has become more globalized and modernized, people's desire for agricultural products has increased dramatically and how agriculture has a significant environmental and economic effect on the world. Furthermore, the historian indicated that the Philippines, a tropical region, was endowed with a tremendous production of abaca in the world, providing 85 percent of the world's abaca fiber in 2007, with millions of Filipino workers, such as farmers, employed and able to participate in the production. The researcher also described it as the Philippines' most significant contribution to global trade.

In line with this, despite the farmers' productivity in being able to supply a massive amount of abaca, the domestic market still experiences a trade deficit, especially in the agricultural sector. According to the ILO, the Philippines has been experiencing a trade deficit for years from 1995 to 2017 under the Philippine-ASEAN trade (see appendix 1). However, Briones (2020) revealed in his research that there is a significant gap between agricultural imports and exports, with imports increasing much faster than the Philippines' agricultural exports. Furthermore, it depicts that the agricultural trade deficit occurred and correlated with the extensive implementation and openness of trade liberalization in the market.

Moreover, Balié and Valera (2020) concluded in their studies that the reformation policy adopted by the Philippines would result in a substantial rise in imports, particularly rice as a staple commodity. The increment by approximately 2.5 million tons is highly anticipated as it will remain high in subsequent years. This result will influence the domestic output of the Philippines to continuously diminish, which will also hurt the consumers, especially the domestic farmers.

Pamplona (2020) studied the state of the Philippines' agriculture industry amidst the COVID-19 pandemic. The researcher utilized the latest information from the Philippine Statistics Authority (PSA), which showed that the Philippines agriculture sector lost roughly 1.2 percent of its value of production from January to March last year 2020, amounting to PHP 441.2 billion in production. The study also compared the Philippines' performance from 2020 with the first quarter of 2018, discovering that agriculture output fell by 2.1 percent and fisheries output fell by 5.2 percent. Further to that, the agriculture sector's poor performance reflected the implications of trade policies, climate change, which exacerbates the country's vulnerability to natural disasters, pandemics, and the like.

#### ***2.5 Into the future: Economic outlook of the Philippine agriculture sector under trade liberalization***

Perez and Pradesha (2019) uncovered policy implications, including the assumption and outlook for the next length of time until 2025, such as the calculated increase in rice imports of 2.34 million mt as a result of the introduction of QR on the rice sector. It is predicted that, as a result of rice liberalization and other policy consequences, local farmers' productivity and production will fall by as much as 9.7 percent, or an estimated 1.3 million mt.

Briones (2017), on the other hand, distinguished in his research that, despite the agriculture sector's low contribution to the Philippines' GDP growth and employment, it remains the key driver of poverty reduction and inclusive growth in the region. Total Factor Productivity (TFP) growth can also be accelerated by investing in supply for expansion, which can also foster and initiate productivity, such as labor and capital production. Growth in the TFP, on the other hand, is dependent on innovation, the incorporation of new technologies and systems, and the closing of technical efficiency gaps. It also has a longer-term potential as a driver of overall growth than growth in the production factors. However, policy support for agriculture is oriented more toward raising private returns to capital than increasing TFP, and the researchers discovered in their study that agriculture has a low growth rate, which will continue as long as TFP remains small.

Briones (2017), in his study of the economic trends of the Philippines by 2030, found that the deceleration of growth in agriculture (measured by gross value added AFF) is caused by the slow growth of TFP. Significantly, the forecasted productivity growth of agriculture is 2 percent on average for the periods of 2017-2030. On the other hand, industry and services have a whopping trajectory of growth, within the said periods, of about 8.2 and 6.7 percent GVA respectively. It is also worth noting that the Philippine government's current policies do not directly benefit TFP, as can be seen in the current case scenario of agricultural underperformance; rather, it is the improvement of research and development, innovation, technological adaptation, and public

goods that will induce its growth. This is synonymous with the report of the World Bank (2020) in support of the Department of Agriculture's "new thinking" for the agricultural sector. It specifically addresses the need to veer away from policies on price support and focus on the overall competitiveness, resiliency, and sustainability of farmers and fisherfolk to revitalize the sector.

Briones (2019) evaluated the competitiveness of the rice market from production to distribution, in which he provided policy recommendations to further stimulate growth and productivity in the industry. One is to build roads that will ease transportation of the goods and will help farmers reach consumers faster. The second is to implement the paddy requirements of mandatory and standards of the land where goods are to be cultivated. Also, the researcher has emphasized the need to abolish the NFA import monopoly and to liberalize investments of imports.

Under the RA 11023, or the Rice Trade Liberalization Law, PhilRice is tasked with improving seed components and extension for promotion of inbred rice seeds, which will boost farmers' overall knowledge to be efficient in their employment. It should be noted that this also aims to minimize costs by 30% and help prevent postharvest losses of about 12% while moving towards a PHP 1 decrease per kilo due to marketing cost reductions. It is also important to emphasize the modernization and mechanization of farm production. As of this writing, three notable projects are being implemented under PhilRice's mechanization program to achieve the aforementioned goals: (1) Mechanization of Rice and Rice-based Farming, (2) Post-Production and Renewable Energy Technologies for Improved Rice and Rice-based Farming, and (3) Modernized Rice Farming through Precision Technology and Intelligence Information Systems (PhilRice, 2019).

## **2.6 Synthesis of the Literature Review**

According to numerous related local and international studies on the consequences of trade liberalization, the Philippines' agriculture sector is indeed the country's most crucial economic field for inclusive economic growth. In the Philippines, the effects of trade liberalization are dependent on the country's present condition, endowment, and policies that a country will implement to protect its border and improve its competitiveness, such as the implementation of the Rice Tariffication Law (RTL), quantitative restrictions, the establishment of the Rice Competitiveness Enhancement Fund (RCEF), and so on. However, it was also proved that developing nations, particularly the Philippines, had a massive trade deficit. Filipino farmers, in fact, are among the poorest workers in the region.

The advantages and risks of the agricultural sector's branches and performances, both in general and in specific terms, were also highlighted in the collection of studies analyzed. As a result of a variety of constraints, frontline traders in Vietnam are receiving the entire benefits of Vietnam's rice export volumes and prices rather than its farmers. Inadequate finance, financial access, or storage technology investment are examples of these impediments. These perceived constraints, according to several scholars, have resulted in inefficiency and poverty in the Philippines' agricultural industry. In conclusion, the researchers in this study have focused on the effects of trade liberalization on the state of the agriculture industry as a whole.

## **3. Research Methodology**

This chapter covers the methods conducted by the researchers in completing this study, such as the implemented research design, strategy, and statistical treatment used in analyzing and interpreting the data of this study, as well as the possible violations.

### **3.1 Research design**

The nonexperimental design was used in this study, with the primary goal of analyzing the correlation between the dependent variables and their explanatory variables. It aids in determining whether a change in one variable influences or has an effect on the other variables. The use of a nonexperimental group or controlled variables in a study with a non-experimental design has aided in eliminating the effects of opposing interpretations of a causal outcome so that the study can be considered fairly accurate by the researchers. This research design served as a road map for readers to better understand how data is collected and interacted in a study, making the delivery of the findings easier to interpret later (Knight, K., 2010). As previously stated, the proponents have utilized three independent variables with the hypothesis that they are all positive determinants of the dependent variable. This way, the researchers will be able to employ correlational research aimed to measure the impact of trade liberalization as an intervention to the output in agricultural production of the Philippines. The independent variables will receive treatment for any possible violations through the diagnostic tests.

#### **3.1.1 Research Strategy**

In this study, a deductive logic of research is used, which involves formulating hypotheses and going through theory to justify the data's outcome. Ricardian Theory, New Trade Theory, and the Heckscher-Ohlin Model are the economic theories on which the research objective is oriented. The agricultural performance in the Value of Production in Agriculture which captures the total revenue of the sector to national income, is observed in this research. A careful investigation was made in assessing trade theories

that can encapsulate the negative or positive impact of trade liberalization on agricultural performance. These theories served as the basis for deciding the collinearity between variables.

As the theories were proven to be relevant to the study's goal, the proponents have gathered secondary data and have identified the hypothesis for each variable using literary support from previous studies and literature. It is important to note that all regulated variables are hypothesized to have a positive impact on agricultural performance, which is believed to be fueled by trade liberalization.

### **3.2 Method for Data Gathering**

This part of the methodology explains the process of data collection and the statistical tools that were used for its analysis.

#### *3.2.1 Data Gathering*

The aim of this research is to observe the dynamic relationship between the Philippines' Value of Production in Agriculture, Trade Openness (Exports+Imports / GDP), Goods Imports, and Employment (Trade). The data to be used by the researchers were both time series and secondary types of data.

After finalizing the data, the researchers have collated and examined it from the Philippines Statistics Authority (PSA) to formulate the research study. The (PSA) is the country's central statistical agency, gathering, analyzing, and disseminating data on the Philippines' economic, social, demographic, political, and government activities. Furthermore, it is one of the country's official organization websites and data sources, and it is extremely accurate and reliable. Although total agricultural imports of the Philippines in quarterly periods from 2000-2019 are unavailable, the researchers utilized the data from PSA and were able to find the variables for the total exports, imports, and GDP of the Philippines to calculate for the trade openness. The researchers were also able to gather significant data for the Goods Imports, Employment (Trade), and Value of Production in Agriculture in the Philippines from the same data source. The research has an analysis and covers the quarterly periods of 2000 to 2019, having a total of 80 observations.

#### *3.2.2 Data Measure*

The relationship between the variables was confirmed and tested through multiple linear regression analysis wherein three independent variables—the imports of goods, trade openness, and the employment (trade sector) attempt to explain the Value of Production in Agriculture. This is in accordance with the rule wherein the presence of two or more independent variables requires the use of multiple regression analysis. Moreover, the use of multiple regression analysis enabled a researcher/s to determine the strength of association between the outcome and predictor variables given by the  $R^2$ , which is an extensive tool in econometrics (Petchko, 2018). To compute the data for trade openness, the researchers processed the necessary calculations through Microsoft Excel. The initial assessment from this statistical technique will be performed through Eviews software (student version). The reliability of the chosen statistical technique will be then backed up by performing the diagnostic tests discussed in the next section to ensure that it meets the assumptions of the multiple regression analysis and thus is safe from committing errors and biased results.

#### *3.2.3 Data Validation*

The use of the econometric technique requires that the assumptions for multiple regression are considered. The proponents of this study have performed preliminary testing and have found out that the proposed model is linear and, thus, the rationale of performing the diagnostic tests stated below in Eviews software.

##### *Breusch-Pagan- Godfrey Test*

One of the assumptions in multiple regression analysis is that error terms are normally distributed for each independent variable. To meet this requirement, the Breusch-Pagan-Godfrey Test will be then utilized. The decision rule is based on the result of the chi-squared statistic, which will determine whether or not the researcher should reject the null hypothesis that the error terms are homoscedastic. If the value of Prob Chi-Square is greater than 0.05, researchers do not reject the null hypothesis and thus satisfy the assumption of being free from heteroscedasticity.

##### *Breusch Pagan Test*

The researchers utilized this test to see if a serial correlation exists in the model. The decision rule is based on the result of the Prob Chi-square value, which will help the researcher to whether or not reject the null hypothesis. If the Prob Chi-Square value is greater than 0.05, researchers do not reject the null hypothesis and thus satisfy the assumption of being free from serial correlation. Serial correlation is a violation of the assumption, and if it exists in the model, it will make the results of the coefficients unreliable.

#### *Jarque-Bera Test*

The test was performed to test the goodness of fit of the model and to identify if the residuals were normal. Note that if the probability value is greater than 0.05, researchers accept the null hypothesis. Therefore, it satisfies the rule and assumption that residuals are normally distributed. If the probability value is lower than 0.05, researchers reject the null hypothesis, and residuals are not normally distributed.

#### *Durbin-Watson Statistic*

The Durbin-Watson Statistic was utilized to confirm the null hypothesis that the model exhibits no autocorrelation; it would be performed to identify the relationship among the residuals and to determine if they are independent or not, with a result of 2. If the DW statistic is less than 2, the researchers then reject the null hypothesis and conclude that there is positive autocorrelation and negative autocorrelation if it is greater than 2.

#### *Variance Inflation Factor*

The Variance Inflation Factor will be used to satisfy the assumption that there is no multicollinearity or that the independent variables have no direct relationship with each other. Therefore, the value of the VIF should not be equal to or greater than 10 to avoid multicollinearity. When this is attained, the independent variables are provided with a safety shield from biases and allow the proponents to measure their genuine effect on the dependent variable. VIF is also utilized to determine the stationarity of the variables, which concludes that independent variables that are 14 and below in central VIF qualifies.

#### *RAMSEY RESET Test*

The test was used to see if the model contained any missing variables. The Ramsey RESET Test helped the researchers in determining whether the model has specification flaws. There are specification mistakes if the t-statistic, f-statistic, or likelihood ratio have a probability value less than 0.05 or a significant probability value. If the probability value of any of the three named measures is more than 0.05 or has an insignificant probability value, the specification error is not present.

#### *3.2.4 Data Treatment*

##### *Cochrane-Orcutt Estimation*

The serial correlation in the model will be removed with this approach. The standard errors are skewed due to serial correlation in the model. The Cochrane-Orcutt Estimators assisted researchers in accounting for serial correlation, treating the model, and validating the regression approach.

### **3.3 Empirical Framework**

#### **Model Specification:**

The study aims to capture and measure the impacts of trade liberalization on the agriculture sector as the dependent variable of this research and is being represented by the variable Value of Production in Agriculture or VPA. To further measure and analyze the impact of trade liberalization on the Value of Production in Agriculture, the researchers included three components as the explanatory variables to explain the variation in the study. The first component is trade openness, including the imports of goods and the employment of trade.

$$\text{Model: VPA} = \beta_0 + \beta_1 \text{TO} + \beta_2 \text{IG} + \beta_3 \text{ET} + \mu t$$

Where:

VPA = Value of Production in Agriculture

TO = Trade Openness (Exports + Imports/GDP)

IG = Imports of Goods

ET = Employment (Trade)

According to the Philippines Statistics Authority, the value of production is the measure to calculate agricultural performance. The dependent variable VPA = Value of Production in Agriculture is composed of the inclusion of two variables, namely the volume of production for the current period and the farmgate price at constant 2018 prices. Symbolically, these variables can be written into  $VPO = Q_t \times FGP_o$ .

In the model, the relationship of trade openness to the dependent variable, Value of Production in Agriculture, is expected to be positive because one of the expected benefits of trade liberalization in the country is that it can enhance the agricultural performance of the Philippines. To get the values for trade openness, the first step is to get the sum of exports and imports, then divide it into the GDP values of the country  $(X+M/GDP)$ . The value of production of each sector, particularly the agriculture sector, is expected to increase as well. Anderson (2017) said that increased trade openness raises national income and makes the economy more stable. To reinforce this claim, Keho (2017) revealed in his research that trade openness boosts economic growth and increases a country's capital wealth. The researchers in this study strongly believe that trade openness has a beneficial influence and relationship on the Philippines' Agriculture, Fishery, and Forestry sectors' value of production.

The second explanatory variable in this model is imports of goods, which are expected to rise as trade restrictions are lifted or decreased as a result of policies introduced under trade liberalization. Furthermore, it is assumed that trade liberalization has a positive impact on the Value of Production in Agriculture because domestic market prices and goods have become more competitive. It also increases agricultural supply, allowing the sector to contribute more to the country's GDP per capita through capital accumulation and productivity growth (Babula, 2008). In fact, agricultural imports accounted for around 13.0 percent of the country's total imports in 2019. For decades, the Philippines has been a major importer of a few agricultural commodities, indicating that import commodities have been supporting food security and addressing supply gaps caused by rising agricultural demand.

It is believed that trade liberalization has a positive impact on the Philippines' value of agricultural performance. The variable employment in the trade sector is also added to measure the mobility of employment in the domestic market under trade liberalization. The agricultural sector employed approximately 10.9 million Filipinos in 2018, accounting for 26% of total jobs (PSA, 2018). The decline in the employment rate in this sector has been attributed to the aging population of farmers and a lack of opportunities to pursue the farming industry. An increase in trade productivity would incentivize not only the current but also the forthcoming farmers who see agriculture as a viable choice as a result of this.

Vu, D. C. (2016) has used and derived the total number of people employed in export-oriented industries to capture the impacts of trade liberalization on the welfare of farmers using employment as a variable. However, due to data unavailability, the researchers in this study will utilize employment in the trade sector to capture the impacts of trade liberalization on agriculture with the use of employment as a channel.

**4. Results and discussions**

**4.1 Evaluation of Results for the Model**

**Dependent Variable VPA**

VARIABLES	COEFFICIENT	STANDARD ERROR	T-STAT	PROB
C	219698.3	103665.2	2.119306	0.0374
TO	-555144.5	70461.71	-7.878670	0.0000
ET	4570.708	968.2579	4.720548	0.0000
IG	0.094373	0.025070	3.764336	0.0003
AR(1)	0.306156	0.127452	2.402122	0.0188
SIGMASQ	4.13E+08	91503752	4.514203	0.0000

**Table 4.1.1**

R2=0.86      DW = 1.8      PROB (F-STATISTIC) = 0.000000  
 R2adj.=0.86      F-STAT = 94.73

The regression result presented above shows that 0.86 or 86% of the dependent variable or the Value of Production in Agriculture (VPA) is explained by the explanatory variables Trade Openness (TO), Employment in Trade (ET), and Imports of Goods (IG). In Trade Openness (TO), an increase in every unit of this variable will lead to a 555144.5 decrease on the dependent variable Philippines' Value of Production in Agriculture (VPA).

For the explanatory variable Employment in Trade (ET), an increase in this variable will lead to a 4570.708 increase on the dependent variable VPA. This also explains a positive relationship between employment in trade (ET) and agricultural performance (VPA) of the Philippines. In the imports of goods (IG), an increase in this explanatory variable will lead to an increase of 0.094373 in the agricultural performance of the Philippines (VPA). The researchers were only able to obtain the total imports of goods in the country and not the total imports of agricultural goods in the country. This limitation has only captured a small measurement of the impact of imports on the agricultural performance of the Philippines as the dependent variable. The small positive relationship

of imports of goods (IG) on the value of production in agriculture (VPA) revealed that imports could contribute to a small growth in the performance of the agriculture sector of the Philippines. All of the independent variables have a significant impact on the dependent variable.

#### 4.2 Evaluation of the Diagnostic Test

<b>Mean</b>	141.9781	<b>Std. Dev.</b>	20451.77
<b>Median</b>	4060.16	<b>Skewness</b>	-0.206085
<b>Maximum</b>	34618.48	<b>Kurtosis</b>	2.143038
<b>Minimum</b>	-45219.43	<b>Jarque-Bera</b>	3.01423
<b>Probability</b>		0.221548	

**Table 4.2.1 Jarque-Bera Test**

The table shows that the residuals are normally distributed for having a probability value of 0.221548.

<b>VARIABLES</b>	<b>COEFFICIENT VARIANCE</b>	<b>UNCENTERED VIF</b>	<b>CENTERED VIF</b>
C	1.07E+10	1026.921	NA
TO	4.96E+09	157.4993	3.193445
ET	937523.4	802.8806	5.423429
IG	6.29E-04	44.13856	8.371857
AR (1)	0.016244	1.196448	1.173164
SIGMASQ	8.37E+15	1.116264	1.077623

**Table 4.2.2 Variance Inflation Factor**

Table 4.2.2, using the Variance Inflation Factor, revealed that the model is free from high multicollinearity for having a centred VIF value not more than 10.

<b>F-STATISTIC</b>	0.667126	<b>PROB. F(3,76)</b>	0.5748
<b>OBS*R-SQUARED</b>	2.052658	<b>PROB. CHI-SQUARE(3)</b>	0.5615
<b>SCALED EXPLAINED SS</b>	0.998778	<b>PROB. CHI-SQUARE(3)</b>	0.8015

**Table 4.2.3 Heteroskedasticity test**

Table 4.2.3 shows that the model is homoscedastic for having a chi-square value of 0.5615 and 0.8015, which are greater than 0.05.

	<b>VALUE</b>	<b>DF</b>	<b>PROBABILITY</b>
T-STATISTIC	1.580387	73	0.1183
F-STATISTIC	2.497625	(1, 73)	0.1183
LIKELIHOOD RATIO	2.751766	1	0.0971

**Table 4.2.4 Specification Error Test**

Garnering a probability value of 0.1183 for *t*-statistic, 0.1183 for *f*-statistic, and 0.0971 for *likelihood ratio*, wherein the values are higher than 0.05, it reveals that specification error does not exist in the model.

**4.3 Discussion**

The findings have backed up the researchers' argument that agricultural performance can be influenced by a variety of factors, including the independent variables used in this study. The research is based on many assumptions based on published journals, both domestically and internationally. In terms of trade openness, Briones (2020) discovered that TO could lead to a considerable rise in agricultural production in imports rather than exports, resulting in a trade deficit. As a result, Keho (2017) finds that increased trade openness will result in increased overall economic growth. However, the results have suggested otherwise, with every unit increase in TO, resulting in the decrease in Value of Production in Agriculture by 555144.5. Furthermore, the evaluation of trade liberalization to developing agricultural economies written by Dodzin and Vamvakidis (1999) is like the above-findings—as it has been discovered that a year after liberalization in trade, agricultural production has shrunk with real agriculture value-added to GDP decreasing at an average of 9.38.

As an agricultural region, the Philippines experienced rapid growth in imports because of the economic impact that trade liberalization brought. Similar to the results of this study, Kohansal (2010, as cited in Gilanin, 2015) found that imports can increase agricultural productivity, especially when utilizing imported inputs that are relatively cheaper than their domestic counterparts, using a two-stage least squares model. On a similar note, Ahulia (1996, as cited in Gilanin, 2015) have looked into the causal relationship between agricultural exports and currency exchange rates, which has become an aid to determine that imported input goods such as fertilizers and technology can positively boost agricultural productivity; considering that the national currency of India is devalued resulting for exports to be reduced.

As previously mentioned by Abubakar (2018), the Ricardian Theory provides the outlook of positive gains of abolishing protectionist policies whereby imports of goods contribute as an indirect production which increases the overall supply and thus provides consumers additional choices. It is also noteworthy to remember that the government has a forward-looking approach in terms of allocating the tariffs to RCEF's initiative of mechanizing agricultural production.

In the Philippine context, employment is highly influenced by agricultural productivity. Recent data have suggested the decline in output and wage throughout the years, 2.5% in 1997-2008 and 0.7% in 2009-2014. Significantly, the report of the PSA about the employment and wage status of agriculture revealed that the average basic wage in the sector had experienced an annual increase of 6.0 average growth from 2015-2019 (PSA, 2020). The result supports the study of Briones (2017), which concluded that despite the diminishing trends, agriculture is responsible for inclusive growth and poverty reduction. Theoretically, based on the Heckscher-Ohlin Theory, freer trade will lead countries to specialize in a sector production that intensively utilizes its unskilled labor. In line with this, Vu (2016) identified that trade liberalization would cause an increase in employment in trade, thus will result in a positive impact on the agriculture sector.

The application of Ricardian Theory has been examined, and the researchers have concluded that it significantly affects supply—similar to the 2008 scenario of the country in international trade that has proved that reducing tariffs have caused to decrease domestic prices as it increased imports and fill the supply deficit which then aided hunger to millions of Filipinos (Abubakar, 2018). Furthermore, Briones (2020) and Laiprakobsup (2019) noted that the Philippines have been importing rice as a result of quantitative restrictions being abolished, and there is an introduction to a more open system of trade.



## 5. Conclusions and Recommendations

### 5.1 Conclusion

The effects of trade liberalization have made the Philippines experience rapid growth of imports in various sectors. On the other hand, trade openness led by trade liberalization has weakened and not directly benefited the performance of the agriculture sector due to various trade agreements and policies, including the lift of tariffs on imports of goods. Although other factors might influence agriculture performance, the conventional view of the import of goods has a small positive impact on the performance of the agriculture sector. In connection with the research gap on the study conducted by Parcon-Santos (2016) regarding the influence of trade liberalization in goods and services on various sectors, liberalization has relatively caused employment in trade to improve the agriculture performance of the sector.

Among these barriers to agricultural production, Casiwan, Dawe, Moya (2006) pointed out that the condition of the Philippine geography has an impact on the agriculture performance of the country. Furthermore, in determining why the Philippines imports a large amount of rice to meet national demand, researchers have emphasized that the Philippines is an all-island nation with less arable land per person than exporter countries that plant more than half of their crop to rice and have a larger river delta like the Mekong River, as cited in appendix J herein.

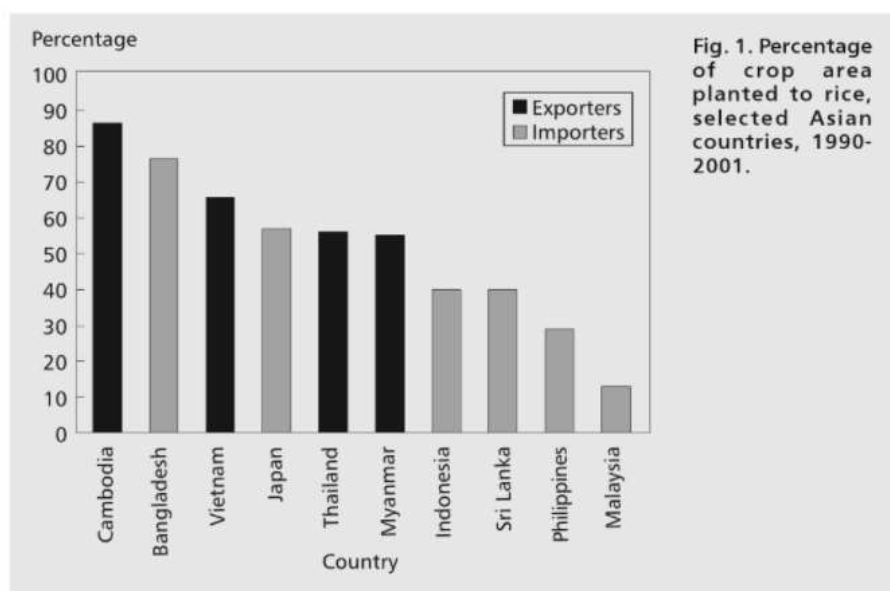


Fig. 1. Percentage of crop area planted to rice, selected Asian countries, 1990-2001.

Source: Casiwan, Dawe, Moya (2006)

### 5.2 Recommendations

The findings of this study allowed researchers to examine the earlier implications of trade liberalization by looking at the country's participation in numerous accords from the late 20<sup>th</sup> and early 21<sup>st</sup> centuries. A study by Glipo & Pascual (2001) of the historical impact of trade agreements on the agricultural sector, particularly the WTO-AOA, was revisited. The revised provisions of the agreement, which include increased agricultural export revenue by 3.4 billion, increased agricultural GVA by 60 billion, and a consistent annual increase in employment of 500,000 jobs, were nowhere to be found, at least in the first seven years of its implementation. In fact, it has further shaped agriculture's export-oriented and import-dependent nature; the unnoticed impacts on developed and developing countries, such as the reduced export subsidies and tariff reductions (tariffs to be reduced by 24% in 10 years for developing countries and 36% in six years for developed countries) have turned the Philippines into a dump for substandard imported goods, making it a net food importer vulnerable to food insecurity and rural deterioration. Agricultural outputs fell by an average of 1.38 percent from 1995 to 2000, compared to 1.62 percent in 1991-1994, while soaring imports in the 1980s inflated trade deficits far more. Together with this impact evaluation and the results of this study, the researchers recommend for the government body to be able:

- To weigh the cost and benefits of welcoming a more open system of trade, thereby noting that the positive impact of a unit increase in imports to the VPA found in this study is only at 0.094373;

- To have a better allocation of budget for the research development in measuring the impact of previous trade agreements, technological relief to manage and monitor the agricultural production of the Philippines, and to strengthen the R & D and the irrigation system of the Philippines as well;
- To assess the net effects of opening the economy for agricultural products, provided that unit increase in TO leads to a decrease of 555144.5 in the country's Value of Production in Agriculture;
- To strengthen the program employed by the Department of Agriculture in innovating and mechanizing agricultural production and incentivizing the farmers to gain overall benefits, as results of the study have found that unit increase in employment leads to an overall increase in VPA by about 937523.4.

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