

Peru-Germany: impact of Covid-19 on coffee agro-exports 2018 – 2021

Peru-Alemanha: impacto do Covid-19 nas agroexportações de café 2018 – 2021

Perú-Alemania: impacto del Covid-19 en las agroexportaciones de café 2018 – 2021

Yohana Mabel Pérez Córdova

yperez@unibagua.edu.pe

orcid.org/0000-0003-0255-7657

Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua

Fiorela Cabrera Villena

fcabrera@unibagua.edu.pe

orcid.org/0000-0003-4217-5346

Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua

Mercy Alexandra Leiva Cabrera

mleiva@unibagua.edu.pe

orcid.org/0000-0002-6412-4008

Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua

Josías Mashian Juwau

jmashian@unibagua.edu.pe

orcid.org/0000-0002-0978-5946

Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua

Dr. Víctor Hugo Puican Rodríguez

vpuican@unibagua.edu.pe

orcid.org/0000-0001-7402-9576

Universidad Nacional Intercultural Fabiola Salazar Leguía de Bagua

ABSTRACT

The objective of this work was to analyze the impact of Covid-19 on Peruvian coffee agro-exports to Germany. Taking the year 2018 as a basis for comparison with the following years, from 2019 to 2021, in which the Covid-19 virus started and spread, thus causing a world sanitary crisis that at the same time affected the commercial exchange. Quantitative research was developed, in addition to a documentary analysis made up of statistical data extracted from reliable sites, such as the National Coffee Board and the Ministry of Economy and Finance. As a result, during the years 2019, 2020 and 2021, a decrease in both production and exports with respect to the base year, in this case 2018, can be seen. In conclusion, the sanitary crisis caused by SARS-CoV-2 did have a negative influence on the different aspects of coffee agro-exports studied. Therefore, it is suggested to analyze the production capacity of Peruvian producers and entrepreneurs; in addition to implementing innovation strategies and adding technological processes to improve their competitive advantage and thus cushion the impact of any negative external event in the future.

Keywords: Agro export, coffee, Covid-19, technology, FOB value.

RESUMEN

El objetivo de este trabajo fue analizar el impacto de la Covid-19 en las agro exportaciones de café peruano hacia Alemania. Tomando al año 2018 como base para la comparación con los siguientes años, del 2019 al 2021, en los que se inició y propagó el virus Covid-19; causando así una crisis sanitaria mundial que a la misma vez afectó el intercambio comercial. Se desarrolló una investigación de tipo cuantitativa, además de un análisis documental conformado por datos estadísticos extraídos de sitios confiables, tales como la Junta Nacional de Café y el Ministerio de Economía y Finanzas. Obteniendo como resultado que, durante los años 2019, 2020 y 2021 se puede apreciar una disminución tanto de producción como de exportaciones con respecto al año base, en este caso el año 2018. En conclusión, la crisis sanitaria causada por el SARS-CoV-2 si tuvo influencia negativa en los diferentes aspectos estudiados de las agro exportaciones de café. Es por ello que se sugiere analizar la capacidad productora de los productores y empresarios peruanos; además de implementar estrategias de innovación y adicionar procesos tecnológicos para la mejora de su ventaja competitiva y así amortiguar el impacto de cualquier suceso externo negativo en un futuro.

Palabras clave: Agro exportación, café, Covid-19, tecnología, valor FOB.

RESUMO

O objetivo deste trabalho foi analisar o impacto da Covid-19 nas exportações agrícolas de café peruano para a Alemanha. Tomando o ano de 2018 como base de comparação com os anos seguintes, de 2019 a 2021, em que o vírus Covid-19 começou e se espalhou; causando assim uma crise de saúde global que ao mesmo tempo afetou o comércio. Foi desenvolvida uma pesquisa quantitativa, além de uma análise documental composta por dados estatísticos extraídos de sites confiáveis, como o Conselho Nacional do Café e o Ministério da Economia e Finanças. Obtendo como resultado que, durante os anos de 2019, 2020 e 2021, verifica-se uma diminuição tanto da produção como das exportações em relação ao ano base, neste caso o ano de 2018. Em conclusão, a crise sanitária provocada pelo SARS-CoV - 2 se influenciou negativamente os diferentes aspectos estudados da agroexportação de café. Por isso se sugere analisar a capacidade produtiva dos produtores e empresários peruanos; além de implementar estratégias de inovação e agregar processos tecnológicos para melhorar sua vantagem competitiva e, assim, amortecer o impacto de qualquer evento externo negativo no futuro.

Palavras-chave: Agroexportação, café, Covid-19, tecnologia, valor FOB.

I. INTRODUCTION

Over time, Peruvian coffee has become the second most important agricultural export product worldwide, after mining, which not only leads agricultural exports, but is also one of the sectors that generates a third of agricultural employment directly and indirectly in the country. Being the Peruvian coffee one of the agro export products with greater relevance within the Peruvian state in recent years. So this research manuscript aims to analyze whether there has been an increase or decrease in the agro export of Peruvian coffee to Germany between the years 2018-2021, taking into account the impact of Covid-19.

Regarding the international arena we can take into account that as a result of the Covid-19 and the different restrictions that had to be taken as security measures; which generated a great impact on the economic sector, since it affected the export of various agricultural products, resulting in lower foreign exchange earnings as an effect of this conflictive situation. One of the security measures that affected exports was the closing of borders, affecting the commercial sector. (Bahnareanu, 2020). In addition, Deina et al. (2021) mentioned that coffee is a delicacy not only loved in countries that have tradition in its trade. Due to the value of its commercialization, the coffee industry is expressive of the world economy. Domestic coffee consumption and exports have moved the international trade balance. However, coffee exports are subject to price fluctuations, which causes risks for farmers, importers, marketing institutions and consumers. Similarly Guido et al. (2020) note that coffee supports the livelihoods of millions of smallholder farmers in more than 52 countries and generates billions of dollars in income. The threats posed by Covid-19 to the global coffee sector are therefore distressing and have profound implications for coffee production. The financial impacts will be persistent and uneven, and smallholders will be among the hardest hit.

According to the Ministry of Agrarian Development and Irrigation, one of the most valuable markets for coffee agro exports is in Germany. (2018) said that one of the most valuable markets for coffee agro export is in the country of Germany, that is why the participation of Peruvian coffee in that country is a great achievement. The increase of Peruvian coffee exports destined to Germany, would show the advance of the quality of our product, given that the competitiveness in the coffee market has been increasing according to the demand of consumers. (Committee on Foreign Trade, 2019) Likewise, Hernandez et al. (2020) mentioned that Covid-19, symbolizes a global shock for the purchase and sale of coffee because it represents a great challenge for producers and farmers. He also states that the Covid-19 virus will affect the food, nutrition and economic situation of many coffee producers in the world, since they are small farmers in countries with weak economies and, at the same time, unprepared to face a pandemic like the one we are experiencing. Because of the difficult situation, these small producers have formed associations and cooperatives to increase their income.

In the national context, it could be seen that, in Peru, coffee agro-export is the second most relevant sector after mining and the first in the hiring of personnel, creating direct and indirect jobs as cited in OmniaSolution (2021). Likewise, Vargas et al. (2021) mentioned that coffee cultivation has cooperated differently in Peru's economic development in recent years, and that coffee is a commodity and a minority of selected exporting companies control a large share of the market, so that farmers' organisations play a secondary role in setting prices and production targets. Market research conducted in 2017 on Peruvian coffee indicates that the activities carried out on coffee move approximately \$200 million a year and involves thousands of exporters, roasters and buyers worldwide. However, in our country, the coffee market faces a great international competition in coffees with countries like Colombia or Mexico and others that present relevant characteristics such as Peru, but have advanced scientific and technological works. (Dilas & Cernaquè, 2021). Taking into account that in our country more than 90% of the production is exported only as raw material as it is mentioned in the following table. (Ramos & Ramírez, 2019). However, the quality of the Peruvian product is very good even without the facility of machinery. Machinery that is being acquired according to the possibilities of associations and / or with programs provided by the state or private entities that want to boost this sector, he implied (Barzola et al. 2020).

This study was justified in the social aspect since this research will serve as an incentive for cooperatives or companies to train their workers and partners so that they can improve and develop their production and marketing capabilities of quality coffee. In addition, this study will help significantly in this aspect because the vast majority of countries that produce coffee are developing economies, which is why coffee originates and becomes a source of work and economic income for small producers in different coffee growing countries.

It also had a theoretical justification because it will allow the development of future research through good information, extracted from websites, journals and articles. Also because it will help producers to expand their knowledge through the collection and processing of information, reliable and updated with the issues related to the agro export of coffee to improve and increase exports of our country through the development of new ideas and opportunities. At the same time help producers to make the right decisions in any difficult situation so that they can obtain optimal results to avoid future losses. On the other hand, it had a practical justification because we will provide relevant information for all those companies producing and exporting Peruvian coffee, who will get a different vision identifying the problems, the potential market and adequate production, as well as serve to conduct a thorough analysis and learn the causes and / or consequences of the results that the country gets about the agro export of coffee. With this to achieve the criterion to make recommendations or reach certain conclusions regarding the production and exports of coffee in our country. In addition, the present scientific article had as methodological justification to know more about the effect of the Covid-19 in the process of agro export of Peruvian coffee to Germany, through obtaining real and updated data that provide us with recognized and reliable sources, so it can be verified in a scientific way and once they are demonstrated its validity and reliability will facilitate the development of further research in public and private institutions both internationally and nationally.

II. THEORETICAL FOUNDATION

In the international background we can mention that Figueroa et al. (2019) through their study conducted whose research aimed to analyze the effect of prices of coffee groups selected by the ICO, where he observed that the quantity produced of coffee has inverse relationship for with exports; instead it has a direct relationship with prices. Finally, the authors of the study concluded that prices on the international market have a strong influence on the variability of coffee production and exports.

Likewise, Urioste et al. (2020) in their research had as a relevant objective to analyze the effects of the measures implemented to appease the impact of the coronavirus in rice crops located in Latin and Caribbean countries. It showed that the product of limitations on the non-transmission of the effects of Covid-19, affected 10 nations in a very severe way due to the closure of borders, ports, and a small amount of cargo ships. Bringing with it a decrease at the beginning of the 4 months of the year in similarity with the same lapse of time in 2019 in the territories of Central America, unlike the territory of Costa Rica and El Salvador, in which it is estimated that it was expected to increase the amount of imports and that it lasts in the short term. Finally, through this analysis, the authors concluded that the authorities of each country should implement a successive chain of policies and actions aimed primarily at strengthening the sector, with the goal of encouraging food production and thus can obtain the supply during the cycle of relegation in the medium term.

While in the same year Macías et al. (2020) in their study had the purpose of analyzing the exports of the country of Ecuador and the impact of the sanitary emergency. The results of their analysis showed that 70% of the productive model of Ecuador had a severe crisis because it was paralyzed due to the restrictions taken by the state to avoid the transmission of Covid-19. However, the authors concluded that thanks to the analysis it was also possible to observe that there were products such as cocoa and bananas that had less impact in the first semester since their exports showed an increase of 20.3%, which led to allow that in the first months of the year the balance of payments presented a surplus of US\$395.4 million dollars in the same year.

In the same way Bonomelli (2020) through his study, which aimed to propose an analysis of the outbreak of the health crisis caused by covid-19 that occurred worldwide and at the same time show the effect it brought about within international trade. The results showed that the Covid-19 pandemic prompted an examination of profitable models in order to face a completely different world. It also showed that the coronavirus was able to accelerate trends in global trade, such as the intangible trade world. And lastly, the author concluded that this inclination will lead to an increase in the coming years, which will incite to survive and compete in a world of technological commerce, full of virtual fairs and changes in digital marketing.

According to Elhali et al. (2020) their research analysed the microbial ecology in the fermentation of Australian coffee beans. This study resulted that through culture-dependent methods they demonstrated that yeasts, LAB, AAB and Enterobacteriaceae grew significantly (about 10-fold) during wet fermentation of Australian coffee beans conducted at laboratory bench scale. Yeast counts remained high during fermentation, with *Hanseniaspora uvarum* and *Pichia kudriavzevii* being the predominant species.

Hanseniaspora uvarum has also been recognized in coffee fermentation elsewhere, however, *Pichia kudriavzevii* was isolated for the first time in the present study. Finally, it was concluded that a large and diverse microbial community consisting of yeasts, bacteria and filamentous fungi exists in the wet fermentation of Australian coffee beans. Most of the microbial species in the community have been reported for wet fermentation of coffee beans in other parts of the world, but the yeast *Pichia kudriavzevii* was isolated for the first time in wet fermentation.

In addition, Viveros (2020) in his study aimed to examine the impact of Covid-19, the provisions applied by the Colombian state and how all this affected international trade. The result of this analysis was that coffee exports have fallen by 12.3% regardless of the increase in the exchange rate in favor of the Colombian peso. Due to the aforementioned, the transactions of traditional products plummeted by 48.2%. Therefore, the author concluded, through various documents, that Colombia's exports plummeted in the agricultural sector, fuels, manufactures, petroleum products and coal because world consumption declined, greatly affecting this country.

According to Villarreyna et al. (2020) in their research they set out to identify the socio-economic and management factors that favour the development of coffee rust in Nicaragua and to learn how farmers perceive these epidemics. This study found that the elements related to the impacts of coffee rust were mostly direct factors at the plot level, rather than indirect factors that determined a farmer's ability to cope with the disease, and also confirmed that coffee rust epidemics had economic drivers that determined crop and disease management, and not only depended on meteorological aspects and host plant characteristics. Given the results, the authors concluded that the main drivers of coffee rust epidemics were meteorological, that rational fungicide spraying and fertilizer application were key practices in the management of coffee rust.

Regarding the national background the author Alarcón (2017) in his research work mentioned that it aimed to establish the connection between export and capacity of coffee production in the years 2008-2016. Also, the most relevant result was that the quality and pleasant taste of Peruvian coffee have been able to conquer and attract the main international markets. In 2011, exports grew to US \$1,597 million, representing an 80% increase in exports by 2010. Finally, the author concluded that, through the hypothesis addressed in the study on the connection between export volume and magnitude of coffee production has proved positive and effective, since there is a high relationship between the aforementioned indicators.

While Huansha (2019) in his research sought to identify the impact of both non-traditional and traditional exports on economic growth in Peru, in the years 1950 - 2018. Therefore, the results obtained confirmed that there is an impact on economic growth. Consequently, the regression shows that the variations of traditional and non-traditional exports are the explanation for 74% of the variation of economic growth, it also indicates that there is an increase or increase in traditional exports (1%); so the GDP increased 0.5309%. While if there is a 1% increase in the non-traditional export then the GDP will increase by 0.2063%. Finally, it was concluded that both traditional and non-traditional exports had a direct impact on economic development in the period chosen for the study.

Likewise, De La Barra et al. (2020) whose research aimed to identify and study the monetary effects of Covid-19 on the tourism sector, on hydrocarbon exports and on the mining industry in Peru. As a result, the effects of the pandemic have had repercussions at the international level, causing an economic crisis in Peru. Therefore, a perspective of solutions is provided and achieved through the establishment of three proposals to reactivate the economy of the sectors that have been examined, as well as the bases that are necessary for reinvestment in public and private management practices. Finally, the author concludes that the solutions should be focused on developing the sufficiency of sustainable management of each of the industries, thus presenting an ideal view for the reinvestment of the forms of international entrepreneurship, of productive management and also of the environment; since this would allow that country to be much more competitive internationally.

Choque (2021) through his research analysed how the factors of harvest area, exchange rate, world price and yield affect the export of coffee in Peru. The results obtained show that the world price of coffee shipped outside the country is one of the indicators that has been changing over the years. Besides that San Martín, Cajamarca and Junín are the regions with the primary coffee growing areas, since they have the respective environmental mechanisms that distinguish each of them. As a result, the exchange rate will damage the estimate of money that producers charge for their raw material. Finally, Choque concluded that temperature is a valuable factor that plays an important role in the production and quality of coffee. On the

other hand, the exchange rate hurts the outflow of raw material since it sets the inflow of money that exporters receive for their production.

In addition, the research by Niño et al. (2021) evaluated the consequences of Covid-19 in the agro-exporting group of table grapes from the department of Piura. Of course, the result obtained indicates that the coronavirus generated an enormous social impact, and that the sowing, harvesting and also the exportation of table grapes continued, following the biosecurity measures and the program for the control and prevention of Covid-19, given by the same agro-exporting grape companies. Therefore, in this research the authors concluded that despite the sanitary limitations determined by the State as the growth of costs in the development by the coronavirus, did not influence directly to export, since the campaign had positive results in each of the agro-exporting companies that are in the department of Piura.

This research is centered on scientific approaches such as the competitive advantage proposed by Díaz (1997) where he mentioned that such advantage is the one that establishes a special ability to make an organization grow and position it as one of the preferred organizations in the market. According to that Porter (1990) explains that the competitiveness of a nation depends mainly on industries. Competitive advantage is developed through operational management, technological implementation, and the application of strategies such as cost leadership and product or brand differentiation, these strategies drive companies to have advantages over their peers. It is the function of the state to create the necessary conditions for companies or organizations to develop and enter the world of competitiveness, but it is not its function to participate in the process of any economic activity of a company. Productivity is the main objective of nations to implement in a concrete way the type of standard of living of each citizen, a very important strategy to achieve a competitive advantage of a nation and especially in the specialization of the product or service in which it performs better and import more in what it performs worse.

On the other hand, Haberler (1936) pointed out that the theory of comparative advantage can be demonstrated by the theory of opportunity cost. As well as the opportunity cost of some kind of good, being the proportion that is usually immolated of a second good in order to be able to reach a greater quantity than the first one. Also, the author explains that if a country has a lower opportunity cost in some good, it has the ability to have the comparative advantage, allowing it to achieve a negotiable barter.

In the theory of free trade Gaytán (1996) mentioned that there is a liberated trade between countries that know their different productivity factors, in which the prices of their goods will give by having a leveling turn in which this will have to influence towards a unification, giving rise to the prices of services by effect of free trade in which will arise a decrease in the wage income and with the interest model because of scarcity.

According to Accinelli et al. (2020) noted that sars - CoV-2 or Covid-19 was classified within the genus Betacoronavirus and family Coronaviridae. In this family there are some viruses that can cause severe disease, while others cause only mild symptoms. Likewise, Maguiña et al. (2020) pointed out that the health crisis was caused by a lineage of a type of genetic organism of the family of SARS-CoV-2, in which this type of virus was considered a highly contagious risk, as it had the ability to be transmitted quickly and accurately from one person to another by different types of transmission or immediate contact. This virus was detected worldwide, causing a severe financial, community and health risk in the country, which in previous years was never observed. However, for Córdova & Rossani (2020) Covid-19 (SARS-CoV-2) is a disease caused by a germ that belongs to the coronavirus group. This virus can be found in snakes, bats and pangolins.

The Central Reserve Bank of Peru (2011) defined agro-export as the output of traditional agricultural products that are produced and marketed by national companies or farmers of a given nation and in a given time. On the other hand, the Food and Agriculture Organization of the United Nations (2004) refers that the term agro export is composed by agriculture and export, so we can define agro export as the international commercialization of agricultural products obtained from the worked land. This term can also be defined as the last phase of agricultural production. Phase with higher demands to meet the needs of international consumers. (National Agrarian University of La Molina, 2005)..

Within the dimensions of the variables that have been considered, in the agro export variable we can identify the investment dimension, that is, the payment of the financial requirements that are usually elaborated with the purpose of achieving lasting wealth production (Companys & Corominas, 1988). It is also considered the price defined as the sum of cash or other profit components that are required to obtain a product. (Molina, 2011). Harvest is defined as the crop cycle of the beginning of preparation for marketing.

(Companys & Corominas, 1988). The FOB value is used in foreign trade and includes from production until the cargo is moved and delivered on board the ship, even up to this point the exporter is responsible and pays the costs of the operation. (Carreño, 2017).

Finally, export, which is usually the grouping of goods and services that are auctioned by a given country to a foreign state for its proper use. (Companys & Corominas, 1988)..

With respect to the covid-19 variable, three dimensions have been chosen, which are health crisis, containment measures and economic impact. Thus defining the health crisis as a health problem in which there is the possibility of having a health risk, that is to say, that the health of people can be endangered. (Ayuso & Fontán, 2021). Whereas containment measures refer to measures that have been taken in a given territory and have not been competent to stop the spread of a disease. Therefore, measures and strategies have to be combined to reduce social relations, such as the obligatory use of masks, social distancing, stopping transport, reduction of traffic schedules, temporary closing of borders, etc., according to Blackman et al. (2020). Finally, the economic impact is the contribution that an activity produces in the economy of the people, city, region, country or the world because of a measure or action. (Walker & Crissman, 1996).

In the legal framework of the WTO we can find elements that clearly specify the analysis and concordance of the existing methods that administer international trade. That is why if we want to confirm them we can find them in articles V, VII, and X of the GATT, which has been in force since 1994. It should also be noted that the Singapore Ministerial Conference gave the World Trade Organization the availability to better examine the structure for trade facilitation.

Taking into account that the rules of the World Trade Organization and their respective agreements are the product of negotiations that occur between members of the council. It is for this reason that thanks to its agreements between WTO bodies which leads to conduct a non-discriminatory marketing environment, which specifies both their rights and obligations. However, those countries that have some assurances from the markets of opposing countries that their exporters will be given equal and uniform treatment.

III. METHODOLOGICAL APPROACH

In the present work, a quantitative research approach was considered by collecting and processing reliable information on the agro export of Peru-Germany coffee during the years 2018 and 2021, in order to analyze whether there was an increase or decrease in outflows of goods between these countries, which will finally be presented through tables with numerical data. Taking into account that the quantitative approach is that method that uses statistical diagnostics and in which its research development is focused on mathematical evaluations. (Otero, 2018).

Likewise, correlational level research was taken into account due to the theoretical knowledge about our two variables of the present topic. This level of research was chosen in order to find a way to present statistics of quantitative origin, analyze the data and complete the objective of this study, in this case, to know the effects of Covid-19 in the agro export of Peru-Germany coffee. Therefore, according to Hernandez (2014) descriptive correlational research is defined as the study that seeks to discover the relationship between two variables in particular. Mostly it seeks to find a relationship between two variables, but repeatedly in the study three or more variables may be used.

Deciding to use a type of non-experimental design, since through it were not managed to manipulate any of the variables. Thus determining that the non-experimental design is the study that is executed without having any manipulation of the variables, i.e., only the phenomenon is studied in its natural context and then examined (Hernández et al. 2010).

Taking into account as a population to study the statistical data between the periods 2018 and 2021 for the analysis of levels of agro exports of coffee. And thus to know if there was an increase or decrease in outflow of goods of this type, considering that during the period mentioned a pandemic was triggered by the Covid-19. Defining the population as the set of elements with a series of specifications with which the parameters of the sample are defined. (Hernandez & Romo, 2018).

In addition, as a technique has been chosen to documentary analysis which is made up of statistical data between the years 2018-2021 of agro exports of coffee Peru-Germany. In which according to Clausó (1993) points out that the documentary analysis is the grouping of operations that are subject to show the

data and the structure of a credential in order to be able to make possible its view or compilation, or even to elaborate beneficial products that are useful as a substitute. Having as finalized the obtaining of data by means of specific techniques in order to facilitate the identification of data (Campos et al. 2021).

The present research work has been initiated taking as an objective to study the increase or decrease of the agro export of Peruvian coffee to Germany, taking into account that at the end of 2019 a pandemic product of the Covid - 19 started, making mention that the agro export sector is one of the most hit in our country. Considering the importance of the mentioned sector and the pandemic is that this research work was started with chapter one in which we can find the introduction, which specifies both international and national problems. The theoretical framework has also been included, where the objectives, results and conclusions of authors with international and national research are mentioned.

To then give way to chapter two which mentions the objective, results and conclusions; information obtained from different authors whose research we were able to collect information to analyze and thus help us understand more about the problem raised. As well as background, approaches, concepts, legal basis, dimensions have also been made.

The descriptive statistical method has been used to obtain data and results through tables, graphs; since the descriptive statistical method according to Martínez (2011) is defined as the grouping of antecedents that have been acquired by means of small numbers of values to then analyze them and obtain simple and organized information.

Finally, in the ethical aspects, it was taken into account that each of the information collected favors the scientific community. As well as transparency and originality as it is of utmost importance for any research. The bibliographic sources and the compiled information have been reflected in this document with responsibility and taking care of the recognition to the authors and institutions.

IV. RESULTS AND DISCUSSION

Table 1

Average Production per Ton of Peruvian Coffee from 2018 To 2021

Year	Ton	Var. %
2018	260000	0.0%
2019	240671	-7.4%
2020	162530	-37.5%
2021	69139	-73.4%

Note: *Average Peruvian coffee production over the years.*

According to information obtained regarding the production of coffee in tons it can be seen that, in the year 2019 there is decrease in the average production with a percentage of -7.4% compared to 2018. However, during the period from 2018 to 2020 it could be noted that the production of coffee by tons decreased abruptly by -37.5% due to the pandemic of covid-19. While in the year 2021, a drop of -73.4% is observed compared to the year 2018.

Table 2

Average Peruvian Coffee Exports per Ton to Germany from 2018 to 2021

Year	Ton	Var. %
2018	57600	0.0%
2019	52139	-9.5%
2020	4958	-91.4%
2021	21063	-63.4%

Note: *Average export of Peruvian coffee to Germany.*

According to the data obtained on the export of coffee in tons in 2019 it could be observed that it decreased by -9.5% compared to 2018. On the other hand, the exported tons in the period of 2020 compared to 2018 suffered a decrease of -91.4% due to the restrictions given by the Peruvian State and due to the

increase of Covid-19 cases in Peru. While in the period of 2021 the export of coffee per ton did not have so much impact so it can be seen that there was an increase of 63.4% based on the year 2018.

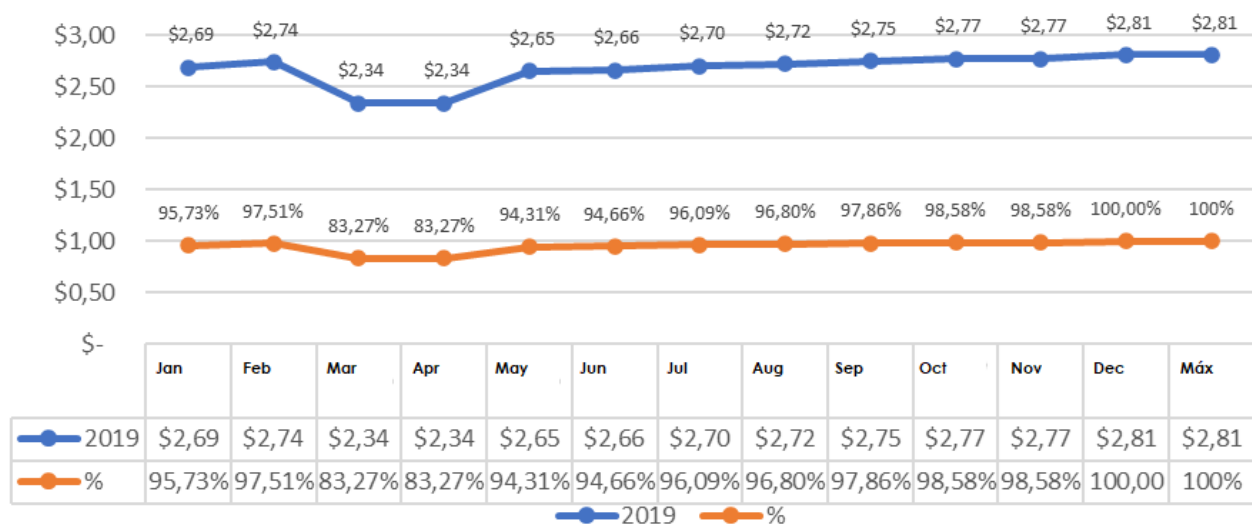
Table 3
 Comparison of FOB prices between the months of the year 2018

	2018	%
January	\$ 2.68	98.17%
February	\$ 2.66	97.44%
March	\$ 2.55	93.41%
April	\$ 2.34	85.71%
May	\$ 2.55	93.41%
June	\$ 2.68	98.17%
July	\$ 2.63	96.34%
August	\$ 2.60	95.24%
September	\$ 2.52	92.31%
October	\$ 2.56	93.77%
November	\$ 2.70	98.90%
December	\$ 2.73	100.00%
Maximum	\$ 2.73	100%

Note: Free On-Board price comparison in dollars per kilogram with respect to the highest price in 2018.

In 2018 Peruvian coffee prices during the months of January and February have been maintained, since the decrease was 4.39% with respect to the maximum price found in the month of December. While in March and April of the same year a fall of -20.88% could be seen in relation to the maximum price. However, in the months of May to August prices were maintained, because there was only a decrease of -9% approximately unlike the previous 2 months with respect to the month with the highest price. At the same time, it is observed that September and October there is a difference of -13.92%, with respect to the maximum price, a little higher than the previous 4 months. So, in the same context of the month of November the price difference was 1.1% compared to the maximum price of the same year.

Figure 1
 Comparison of FOB Prices between different months since 2019

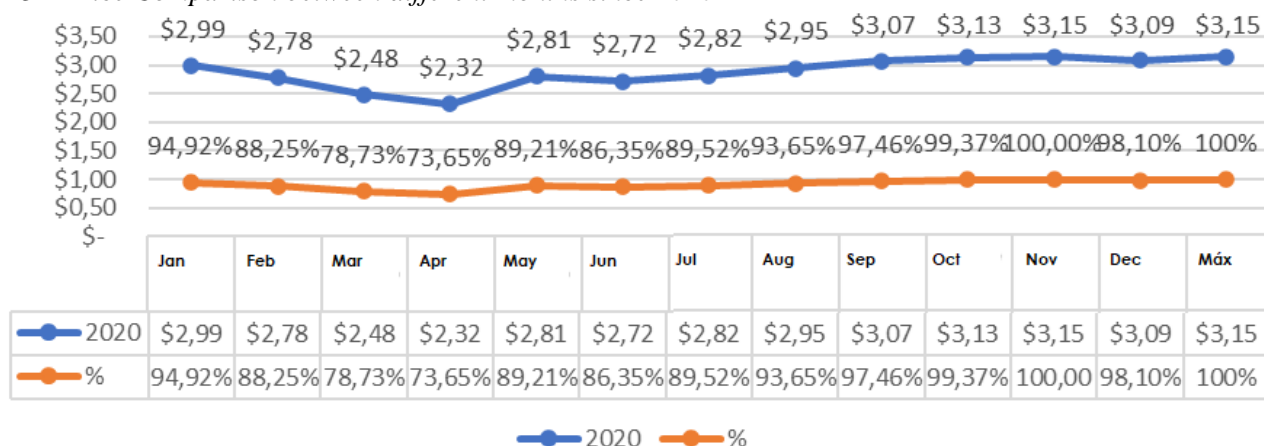


Note: Free on Board price comparison in dollars per kilogram with respect to the highest price in 2019.

According to the graph presented it can be seen that, during the period of 2019, the prices of Peruvian coffee in the month of January and February suffered a fall of -6.79% with respect to the maximum price of the same year which was the month of December. However, in the months of March and April, a decrease of -23.46% could be seen in relation to the limit price. While in May and June prices stabilized, because its decrease was -11.03% unlike the last 2 months. So, in the months of July to November its price had a decrease of -11.91% in comparison with the border price of the same year.

Figure 2

FOB Price Comparison between different months since 2020

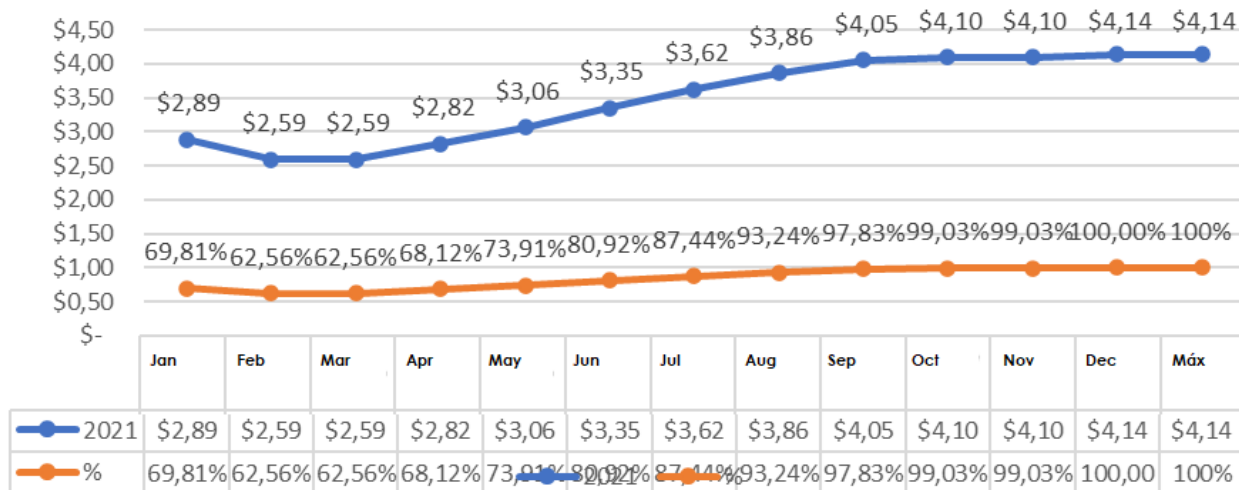


Note: Free on Board price comparison in dollars per kilogram with respect to the highest price in 2020.

From the evidence observed through the previous graph it can be specified that in 2020 was a very difficult year for the global economy, due to the mandatory social isolation used to try to curb the advance of the pandemic caused by Covid-19, and not only that, but it put a stop to the global demand and supply of products. It is for this reason that the months with the biggest drop were March and April with -47.62% in relation to the month of November which has the highest price of the same year. Although the other months such as May to August maintained their prices, since it has a decrease of -41.27% unlike the previous months and in relation to the price line. And finally we have the months of September and October that have a minimal difference of -3.17% compared to the highest price.

Figure 3

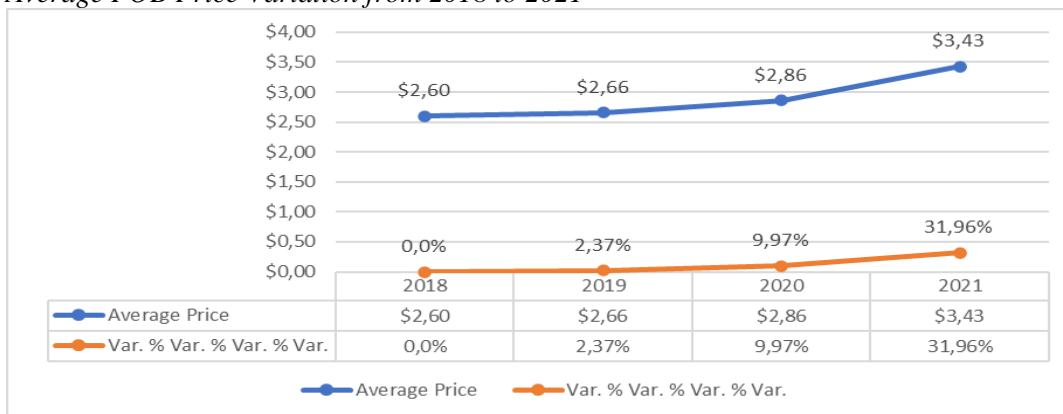
FOB Price Comparison between different months since 2021



Note: Comparison of Free on Board prices in dollars per kilogram with respect to the highest price in the year 2021.

From the above graphs it can be concluded that in the year 2021 it could be seen that in the month of January there has been a decrease of -30.19% with respect to the month of December which obtained the highest price in that year. However, in the months of February, March and April it can be observed that there was a fall of -69.32% in relation to the limit price. While in the month of September to November it was observed that the prices were maintained, since they only had a minimal difference of -4.09% compared to the month of December of that year.

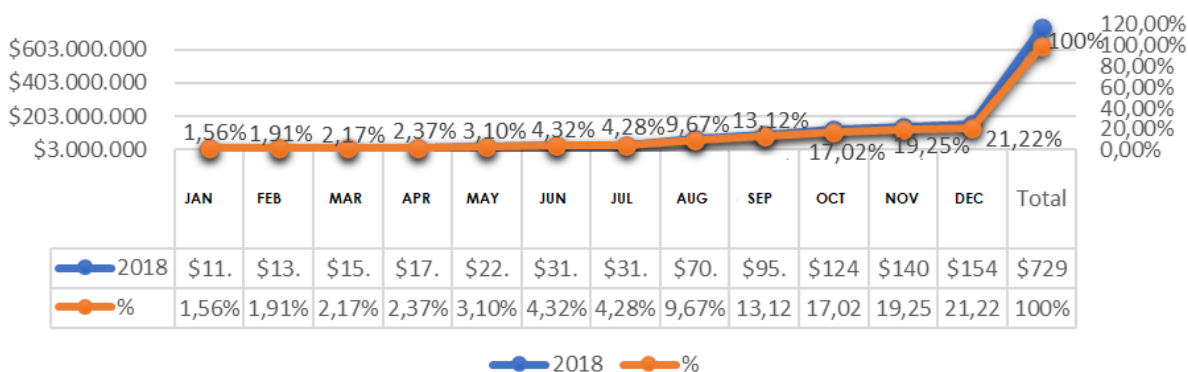
Figure 4
 Average FOB Price Variation from 2018 to 2021



Note: Free on Board price variation in dollars per kilogram with respect to the average price from 2018 to 2021.

According to the graph shown, it can be seen that the variation of FOB prices in 2019 compared to 2018 has had an increase of -2.37%. While in 2020 I can see an increase of -9.97% compared to the base year which was 2018. However, for 2021 managed to obtain a development of -31.96% compared to 2018.

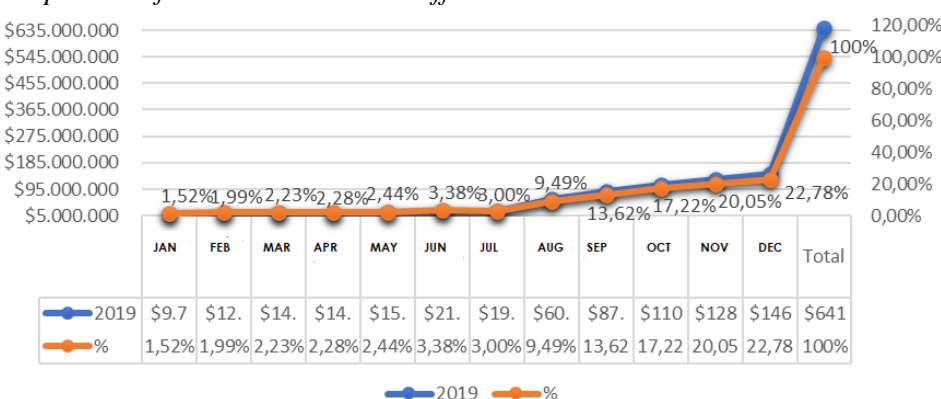
Figure 5
 Comparison of FOB Value between different months since 2018



Note: Comparison of the Free on Board Value between Peru-Germany in the different months of 2018.

According to the table and figure 8 you can see the comparison of how the FOB value has been increasing between Peru and Germany in 2018. So with the figures shown it can be seen that, based on the total of that year, the month of December is the one that represents the highest percentage with 21.22% of the total. In addition to evidencing the large increase from the month of July onwards. For example, if we compare the increase in July and August we find 4.28% and 9.67% respectively. Having between these two months an increase of at least 5.39%; quite a high percentage compared to the other months that the increase did not exceed 1%.

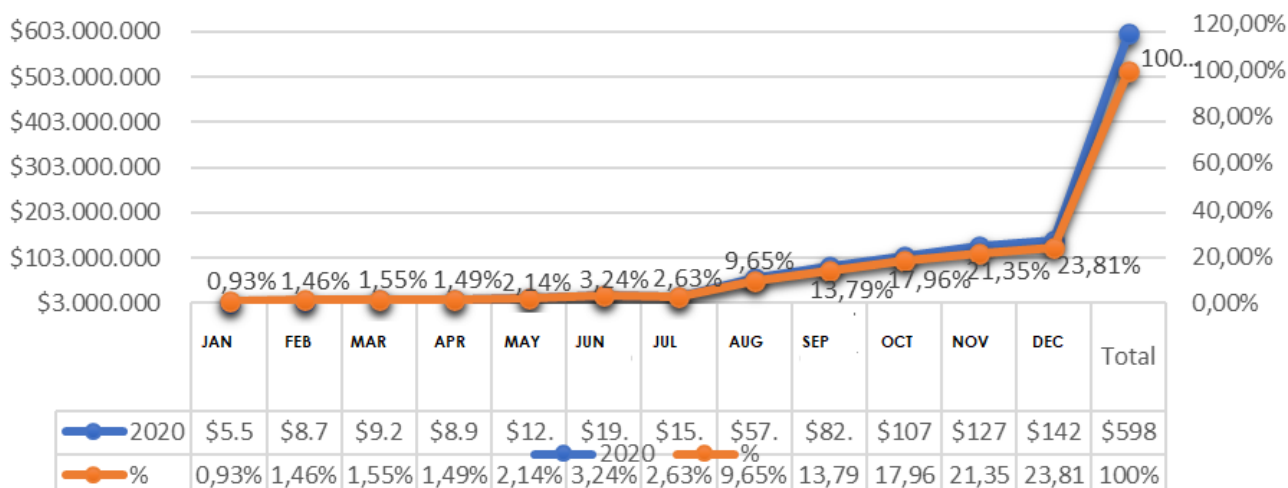
Figure 6
 Comparison of FOB value between different months since 2019



Note: Comparison of the Free on Board Value between Peru-Germany in the different months of the year 201.

As for the year 2019 it can be seen that the month that had the highest FOB value is December, so it was calculated based on this, the development of the value has been progressive since the month of January until the end of the year. But also taking into account that from July to August and onwards the increase in FOB value has been much higher than in previous months. For example, between the month of July and August there is a difference of at least 5% since in the month of July the representative percentage with respect to the total is 3%, while the month of August has 9.49% of representative percentage with respect to the total. So, we can say that in the second half of 2019 the FOB Peru-Germany value had a greater increase.

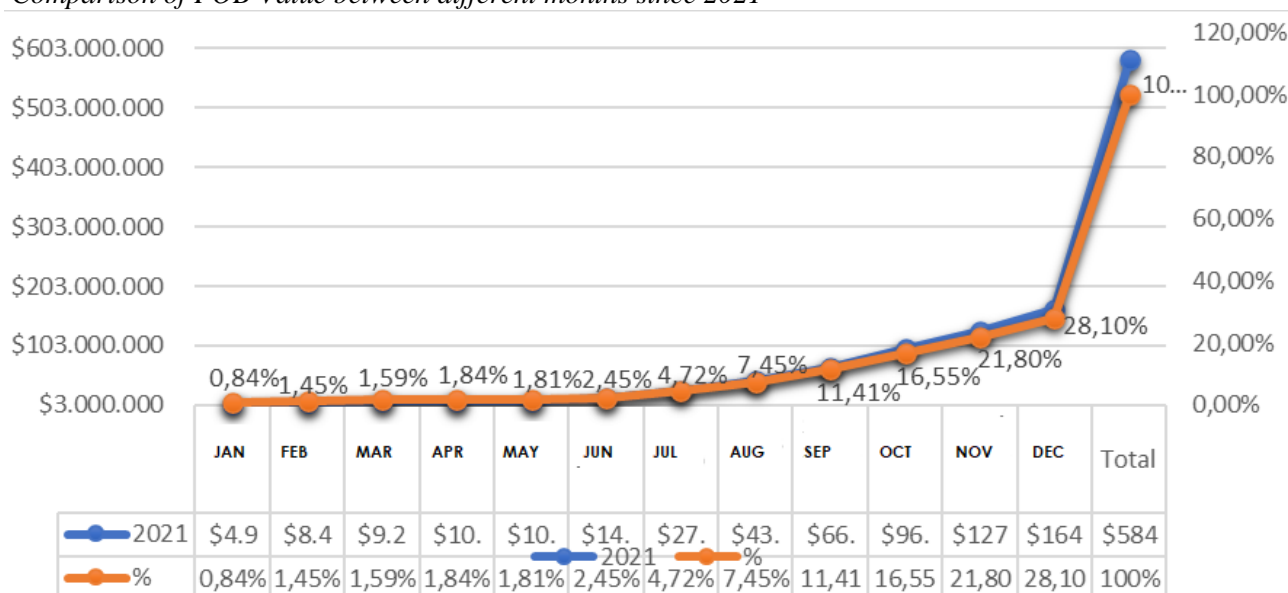
Figure 7
 Comparison of FOB Value between different months since 2020



Note: Comparison of the Free on Board Value between Peru-Germany in the different months of the year 2020.

In the year 2020 the increase in FOB value has been favorable - becoming more noticeable in the second quarter of that year, since from the month of July the percentage increase with respect to the total is relevant. The month of July represents 2.63% of the total, while the month of August represents 9.65%; thus showing a difference of at least 7%. Thus, the month of December is where the FOB value is the highest, representing 23.81% of the total.

Figure 8
 Comparison of FOB Value between different months since 2021



Note: Comparison of the Free on Board Value between Peru-Germany in the different months of the year 2021.

The comparison of the FOB value of the year 2021 gives as a result that, during the first semester of the mentioned year, it has been increasing in no more than 1% between those months. While the second half is notorious increase with no less than 2%. The most notorious increase is of 6.3% between November and December with 21.80% and 28.10% respectively. Not to mention that the month of December with 28.10% represents the highest percentage of the total FOB value in the year 2021.

Table 4

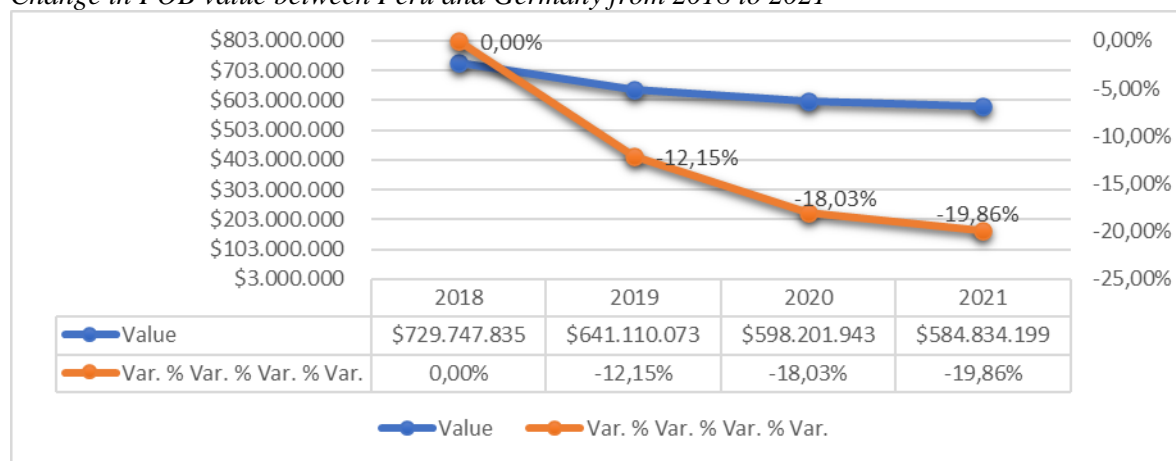
Variation of FOB value between Peru and Germany from 2018 to 2021

	Value	Var. %
2018	\$ 729,747,835	0.00%
2019	\$ 641,110,073	-12.15%
2020	\$ 598,201,943	-18.03%
2021	\$ 584,834,199	-19.86%

Note: Variation of the Free on Board Value between Peru-Germany from 2018 to 2021.

Figure 9

Change in FOB value between Peru and Germany from 2018 to 2021



Note: Variation of the Free on Board Value between Peru-Germany from 2018 to 2021.

In this table we have the possibility of appreciating that, throughout the years 2019, 2020 and 2021, the decrease with respect to the FOB value of 2018 has been noticeable. For example, the variation of the year 2019 with respect to 2018 is -12.15%; becoming more noticeable the decrease in the years 2020 and 2021 with -18.03% and -19.86% respectively based on the value in 2018. Taking into account that during the years mentioned the strong presence of the health crisis in both countries.

The results obtained from the years 2018, 2019 and 2020 of the average production per tons are significant declines that put at risk the level of agro exports of Peruvian coffee, because as seen in Figure 1, it has had jumps in figures such as: -7.4%, -37.5% and -73.4%, which had already been showing a worrying situation for entrepreneurs in the sector, however, the spread of the Covid-19 virus sharpened such a scenario, by the same fact that the states decreed confinements and regulations, in order to safeguard the lives of citizens. All this, differs with what Alarcón (2017) mentioned, that in 2011 Peruvian coffee conquered and attracted the main international markets, being one of its most important achievements in terms of quality and flavor, in addition, exports grew to US \$1,597 million, thus representing for 80% of exports compared to the previous year.

We must concatenate the above mentioned lines with the scientific approach raised by Gaytán (1996) in the theory of Free trade, where he argued that there is a liberated trade between countries that know their different productivity factors, since the goods will give by having a leveling turn in which this will have to influence towards a unification, giving rise to the prices of services by effect of free trade in which will arise a decrease of the salary income and with the interest model because of the scarcity. Therefore, it is particularly determined that the level of exports of the coffee sector depends singularly on the amount of production equivalent to the supply capacity that it intends to reach.

Regarding the quantities of the average export of coffee to Germany we have the following data: -9.5%, -91.4% and -63.4% shown in graph 2, which determines a severe decrease from 2019 to 2020, we must point out that the great fall that was recorded in 2020 is literally due to the spread of the virus Covid-19 and a recovery is recorded in the year 2021 by the opening of the agricultural sector that was fundamental to stabilize the economy of entrepreneurs who depend strictly on this item. This agrees with Macías et al. (2020) that analyzes the exports of Ecuador and the effect of the sanitary emergency and it was evidenced that 70% of the productive model of Ecuador had a severe crisis since it was paralyzed due to the restrictions taken by the state to avoid the transmission of Covid-19; exports showed an increase of 20.3%, which led to allow that in the first quarter the balance of payments presents its surplus of US\$395.4 million dollars.

According to the scientific approach pointed out by Haberler (1936) where he pointed out that the theory of comparative advantage can be demonstrated thanks to the theory of opportunity cost. And the opportunity cost of some kind of good that is the proportion that is usually immolated of a second good to be able to reach a greater quantity than the first one. So that, it is necessary to state that under this approach emphasizes the opportunity cost of the Peruvian coffee product in mention, for export issues it is specified that there is a 54.76% weighted average that decreased but shows signs of progressive recovery, all this derives from the economic recovery that the Peruvian state has launched.

According to the data obtained through the graphs observed about the FOB prices (US\$/KGR) between the period of time from 2018 to 2021 with the purpose of knowing its variation with respect to the average price. It was obtained as a result that in the year 2019 compared to the year 2018, it has been possible to appreciate an increase of 2.37%. While for the year 2020 despite the fact that it was a very difficult year for the world economy, due to security measures, such as mandatory social isolation decreed by the government to curb the contagions of Covid-19; even so, an increase of 9.97% could be observed with respect to the year 2018. Likewise, for 2021, it can be determined that there was a development of 31.96% compared to 2018. These results are supported by the research of Figueroa et al. (2019) which aimed to analyze the impact of the prices of coffee groups selected by the ICO, managing to obtain as results that the study of prices in the international market has much influence on the variability of production and coffee exports. Also, we must take into account that this research is similar to the scientific approach raised by Haberler (1936) in the theory of comparative advantage referred to the ability to produce a good or service at lower costs compared to others. That is why it can be determined that through this approach it is possible to emphasize that the opportunity cost of Peruvian coffee alludes to export issues, in order to be able to positively face the competitive forces and thus generate a return of the Peruvian economy.

According to the data obtained on the variations of the FOB value between Peru and Germany from 2018 to 2021, it can be seen throughout these years that there was a marked decrease in value compared to 2018. During this year it is possible to evidence a remarkable increase in FOB value from July with a percentage of 4.28%. While for 2019 this value continued to increase with a 4.49% compared to the total of the same year. However, if we mention the variation of FOB value for the years 2019, 2020 and 2021 we can see a decrease compared to the base year, in this case the year 2018.

So, in the years 2020 and 2021 takes relevance the issue of the pandemic caused by the virus coronavirus, where you can see the marked decline in FOB value during those years with -18.03% and -19.86% respectively. Whose result is supported by the study of Viveros (2020), which aims to study the impact of Covid-19 and the provisions applied by the Colombian state and how this affected trade. Thus reaching the conclusion that Colombian exports plummeted in sectors such as agriculture, manufacturing, among others, because of the fall in world consumption. Consequence of the different provisions of the governments for the sanitary emergency.

If we emphasize the decreases in FOB value that are becoming noticeable throughout the years 2019, 2020 and 2021 with respect to the year 2018; and taking into account that between the years 2020 and 2021 the sanitary crisis affected the whole world. We can conclude that Bahnareanu (2020) was right in stating that as a result of Covid-19 and the various restrictions that governments had to implement, such as the closure of borders, ended up impacting both imports and exports.

Taking into account the competitive advantage which is explained by Porter (1990), who mentions that this advantage refers to the fact that the competitiveness of a nation depends mainly on the specialization of the product or service in which it performs best. This is how we can see that Peru, being a large agro-exporting country, obtains an advantage in this part of trade with other countries, thus making a place for itself in the German market. However, the issue of the pandemic did significantly affect the FOB value.

Therefore, we recommend taking into account the approach of competitive advantage and what Porter mentioned, to take advantage of the impact that the Peruvian brand has on the export of agricultural products. In addition to the implementation of innovation strategies to improve product differentiation and according to the economic scope of each company, but as far as possible add technological processes for the improvement of the particularity of the product. And thus, manage to cushion the impact of any unforeseen negative event that may arise again later.

CONCLUSIONS

In the years 2018, 2019 and 2020 were at risk the level of agro exports of Peruvian coffee because the production of this product has had jumps in the figures as -7.4%, -37.5% and -73.4% that had been showing a worrying situation for coffee entrepreneurs. It is suggested to analyze the production capacity of Peruvian entrepreneurs and make a comparative analysis on the magnitude of Peruvian coffee yield, to know if the Peruvian production supplies the European market. In addition to strengthening the comparative advantage of the product through certifications such as ISO 9001, thus providing quality coffee.

The export of coffee determines a severe decrease from 2019 to 2020, due to the great fall that was recorded in 2020 because of the increase of contagions of Covid-19 and there is a recovery in the year 2021 by the opening of the agricultural sector that was essential to stabilize the economy of entrepreneurs who depend strictly on this item. It is suggested to analyze the demand of the German market, in addition to developing a quality analysis of coffee and thus strengthen the competitive advantage of the product in the sector.

According to the results obtained through the graphs shown, it was concluded that FOB prices (US\$/KGR) between the period from 2018 to 2021 has managed to obtain very noticeable increases as well as very detrimental decreases. So if we analyze the biggest drops in prices were noted in the month of April, due to the mandatory co-financing, and paralysis of a large number of economic activities. Of which these biosecurity measures proposed by the Peruvian state were not quite counterproductive in the coffee sector, since these prices in the month of November have managed to reach a maximum price compared to 2018. Therefore, it is suggested to conduct a study that can measure the variation of prices more in depth as this would help strengthen the agricultural sector and allow counteracting the impact of any negative circumstances, which may arise in the future, on exports and in turn will sustain economic indicators such as the Gross Domestic Product.

Concluding that according to the results obtained through the dimension of the FOB value, the agro-exporting companies of coffee that have Germany as their main market must take into account that external factors such as the sanitary crisis originated by the Covid-19 virus have great influence in the variation of the value of the merchandise; so it is suggested to implement innovation strategies and add technological processes, to improve their competitive advantage and thus cushion the impact of any negative external event in the future.

REFERENCES

- Accinelli, R., Zhang, C., Wang, J., Yachachin, J., Cáceres, J., Tafur, K., . . . Paiva, A. (2020). COVID-19: la pandemia por el nuevo virus SARS-CoV-2. *Revista Peruana de Medicina Experimental y Salud Pública.*, 37(2), 303-308.
<https://doi.org/10.17843/rpmpesp.2020.372.5411>
- Alarcón, L. (2017). *Exportación y capacidad de producción del café en el peru en el periodo 2008 - 2016*. [Tesis de pregrado. Universidad César Vallejo].
https://repositorio.ucv.edu.pe/bitstream/handle/20.500.12692/32065/Alarcon_VLT.pdf?sequence=1&isAllowed=y
- Ayuso, D., y Fontán, G. (2021). *Gestión de crisis sanitaria* (1era. ed.). Diaz de santos.
https://books.google.com.pe/books?id=0UVIEAAQBAJ&printsec=frontcover&dq=crisis+sanitaria&hl=es&sa=X&redir_esc=y#v=onepage&q&f=false
- Bahnareanu, C. (2020). The Economic Impact of Covid -19 Pandemic at the Beginning of 2020. *Strategic Impact.*, 2, 102 - 112.
https://cssas.unap.ro/en/pdf_periodicals/si75.pdf#page=102
- Banco Central de Reserva del Perú. (2011). *Glosario de Términos Económicos*.
<https://www.bcrp.gob.pe/docs/Publicaciones/Glosario/Glosario-BCRP.pdf>

- Blackman, A., Ibáñez, A., Izquierdo, A., Keefer, P., Moreira, M., Schady, N., y Serebrisky, T. (2020). *La política pública frente al Covid-19: Recomendaciones para América Latina y el Caribe* (1era ed.). Inter-American Development Bank.
- Bonomelli, G. (2020). La pandemia del coronavirus y su impacto sobre el comercio internacional: una mirada sobre el mundo y Argentina. *Revista Integracion y Cooperacion Internacional*, 4(10), 5-12. <https://doi.org/10.35305/revistamici.v0i30.45>
- Carreño, A. (2017). *Cadena de suministro y logística* (1era ed.). Fondo Editorial de la PUCP. <https://books.google.com.pe/books?id=SaLNDwAAQBAJ&pg=PT239&dq=V#v=onepage&q=V&f=false>
- Choque, D. (2021). *Evolución de la exportación de café: 2010-2020*. [Tesis de pregrado. Universidad de Lima]. https://repositorio.ulima.edu.pe/bitstream/handle/20.500.12724/13716/Choque_Alave_Diana-Hilary.pdf?sequence=1&isAllowed=y
- Clausó, A. (1993). Análisis documental: el análisis formal. *Revista General de Información y Documentación*, 3(1), 1-15. <https://revistas.ucm.es/index.php/RGID/article/view/RGID9393120011A>
- Comité de Comercio Exterior, P. (2019). *COMEXPERÚ*. <https://www.comexperu.org.pe/articulo/diagnostico-y-perspectivas-del-cafe-peruano>
- Companys, R., y Corominas, A. (1988). *Planificación y rentabilidad de proyectos industriales* (1ra ed.). Marcombo, S.A. https://books.google.com.pe/books?id=6PNr1sPd-AoC&dq=concepto+de+inversion&hl=es&source=gbs_navlinks_s
- Córdova, A., y Rossani, G. (2020). COVID-19: Revisión de la literatura y su impacto en la realidad sanitaria peruana. *Revista de la Facultad de Medicina Humana*, 20(3), 471-477. <http://dx.doi.org/10.25176/rfmh.v20i3.2984>
- De La Barra, A., Bocanegra, S., y Mayo, J. (2020). *Los efectos económicos sobre el turismo receptivo, la exportación de hidrocarburos y de la industria minera a causa del Covid-19 en el Perú*. [Tesis de posgrado. Universidad San Ignacio de Loyola]. <https://repositorio.usil.edu.pe/server/api/core/bitstreams/52690748-ec57-4462-b14a-31e073d177d3/content>
- Deina, C., do Amaral, M., Rodrigues, C., Ribeiro, M., Trojan, F., Stevan, S., & Valadares, H. (2021). A methodology for coffee price forecasting based on extreme learning machines. *Information Processing in Agriculture*, 1, 1-9. <https://doi.org/10.1016/j.inpa.2021.07.003>
- Díaz, S. (1997). *La ventaja competitiva* (1ra ed.). Ediciones Díaz de Santos, S.A. https://books.google.com.pe/books?id=MQYxXL00hUC&printsec=frontcover&dq=que+es+una+ventaja+competitiva&hl=es&sa=X&redir_esc=y#v=onepage&q=que%20es%20una%20ventaja%20competitiva&f=false
- Dilas, J., y Cernaquè, O. (2021). Enfoque SIAL como estrategia para la producción y comercialización del café especial tostado en el norte del Perú. *Revista de investigacion científica y tecnologica*, 2(2), 2-16. <https://doi.org/10.47422/ac.v2i2.31>
- Elhalis, H., Cox, J., & Zhao, J. (2020). Ecological diversity, evolution and metabolism of microbial communities in the wet fermentation of Australian coffee beans. *International Journal of Food Microbiology*, 321, 2-9. <https://doi.org/10.1016/j.ijfoodmicro.2020.108544>
- FAO. (2004). *Organización de las Naciones Unidas para la Agricultura y la Alimentación*. <https://www.fao.org/3/y5673s/y5673s05.htm>
- Figueroa, E., Pérez, F., Godínez, L., y Perez, R. (2019). Los precios de café en la producción y las exportaciones a nivel mundial. *Revista mexicana de economia y finanzas*, 14(1), 41-56. http://www.scielo.org.mx/scielo.php?pid=S1665-53462019000100041&script=sci_abstract
- Gaytan, R. (1996). *Teoría del comercio internacional* (Primera edición ed.). Siglo veintiuno. <https://books.google.com.pe/books?id=vWAEfcJWwqC&printsec=frontcover&hl=es#v=onepage&q&f=false>
- Guido, Z., Knudson, C., & Rhiney, K. (2020). Will COVID-19 be one shock too many for smallholder coffee livelihoods? *World Development*, 136, 1-4. <https://doi.org/10.1016/j.worlddev.2020.105172>
- Haberler, G. (1936). *The theory of international trade* (1ra. ed.). Edición Alemana. <https://dspace.gipe.ac.in/xmlui/bitstream/handle/10973/25193/GIPE-021573.pdf?sequence=3>
- Hernandez, M., y Romo, F. (2018). *Metodología de la investigación las rutas cuantitativa, cualitativa y mixta*. (Sexta edición ed.). México.
- Hernandez, M., Pandolph, R., Sanger, C., y Vos, R. (2020). *Precios volátiles del café: covid - 19 y factores fundamentales del mercado*. <http://www.ico.org/documents/cy2019-20/coffee-break-series-2c.pdf>
- Hernández, R., Fernández, C., y Baptista, P. (2014). *Metodología de la Investigación*. México: McGraw-Hill. http://metabase.uaem.mx/bitstream/handle/123456789/2792/510_06_color.pdf
- Huansha, M. (2019). *Incidencia de las exportaciones tradicionales y no tradicionales en el crecimiento económico del Perú, 1950-2018*. [Tesis de posgrado. Universidad Nacional Santiago Antúnez de Mayolo]. <http://repositorio.unasam.edu.pe/handle/UNASAM/4202>
- Macías, L., Mero, C., Montalvan, J., y Granoble, P. (2020). Análisis de las exportaciones ecuatorianas no afectada por la emergencia sanitaria. *Polo del Conocimiento*, 5(10), 89-103. <https://polodelconocimiento.com/ojs/index.php/es/article/view/1790/3459>
- Maguiña, C., Gastelo, R., y Tequen, A. (2020). El nuevo Coronavirus y la pandemia del Covid-19-. *Revista Medica Herediana*, 31(2), 125-129. <http://dx.doi.org/10.20453/rmh.v31i2.3776>

- Martinez, A. (2011). Procesamiento estadístico en una empresa productora de pastas alimenticias. *Contribuciones a la Economía*.
<https://www.eumed.net/ce/2011a/amfm.htm>
- Ministerio de Desarrollo Agrario y Riego. (2018). *Plataforma digital unica del estado peruano*.
<https://www.gob.pe/institucion/midagri/noticias/18351-cafetaleros-de-amazonas-exportan-hacia-alemania>
- Molina, L. (2011). *Teoría del precio Justo* (1era. ed., Vol. 1). (F. Gòmez, Ed.) Maxtor.
https://books.google.com.pe/books?id=TQIF45-HivIC&printsec=frontcover&dq=precio&hl=es&sa=X&redir_esc=y#v=onepage&q=precio&f=false
- Niño, L., Sernaqué, J., y Zúñiga, A. (2021). *Covid-19 y su impacto en la exportación de uva de mesa del sector no tradicional proveniente de la región Piura*. [Tesis de pregrado. Universidad Nacional de Piura].
<https://repositorio.unp.edu.pe/handle/20.500.12676/2632>
- OmniaSolution. (2021). *Perú: país agroexportador por excelencia*. <https://omniasolution.com/2021/06/01/peru-pais-agroexportador-por-excelencia/#:~:text=La%20agroindustria%20ha%20permitido%20posicionar,directos%20e%20indirectos%2C%20seg%20%20BAn%20ADEX>.
- Otero, A. (2018). *Enfoques de investigación*. https://www.researchgate.net/profile/Alfredo-Otero-Ortega/publication/326905435_ENFOQUES_DE_INVESTIGACION/links/5b6b7f9992851ca650526dfd/ENFOQUES-DE-INVESTIGACION.pdf
- Porter, M. (1990). *The Competitive Advantage of Nations* (1ra. ed.).
<https://books.google.com.pe/books?hl=es&lr=&id=CqZzxAXBpfEC&oi=fnd&pg=PR23&dq=competitive+advantage+of+nations&ots=Au0mJK-3SA&sig=7GS0kX2HphLdm8QA38jo2cN2lGo#v=onepage&q=competitive%20advantage%20of%20nations&f=false>
- Ramos, G., y Ramírez, P. (2019). *Evaluación del incremento de las exportaciones de café peruano a Alemania debido a la certificación orgánica (2007 – 2017)*. Repositorio Académico, [Tesis de pregrado. Universidad Peruana de Ciencias Aplicadas].
https://repositorioacademico.upc.edu.pe/bitstream/handle/10757/626015/Aliaga_rg.pdf?sequence=3&isAllowed=y
- Universidad Nacional Agraria La Molina. (2005). *Agroexportación. ¿Qué es y cómo se hace?*
<http://www.lamolina.edu.pe/proyeccion/oaeps/noticias/detalledenoticial.as>
- Urioste, S., Graterol, M., Álvarez, M., Tohme, J., Escobar, M., y González, C. (2020). Efecto de la pandemia del COVID-19 en el sector arrocero de América Latina y El Caribe: Un diagnóstico participativo. *Grupo consultivo sobre investigación agrícola internacional*, 1(1), 3-22. <https://cgspace.cgiar.org/handle/10568/108967>
- Vargas, R., Fonseca, C., Hareau, G., Ordinola, M., Pradel, W., Robiglio, V., & Suarez, V. (2021). Health crisis and quarantine measures in Peru: Effects on livelihoods of coffee and potato farmers. *Agricultural Systems*, 187, 2-10.
<https://doi.org/10.1016/j.agsy.2020.103033>
- Villarreyna, R., Barrios, M., Vélchez, S., Cerda, R., Vignola, R., & Avelino, J. (2020). Economic constraints as drivers of coffee rust epidemics in Nicaragua. *Crop Protection*, 127, 2-11. <https://doi.org/10.1016/j.cropro.2019.104980>
- Viveros, W. (2020). *Efecto del Covid-19 en las exportaciones colombianas*. [Tesis de pregrado. Universidad Antonio Nariño].
<http://repositorio.uan.edu.co/bitstream/123456789/3243/2/2020WuendyPaolaViverosCampo.pdf>
- Walker, T., y Crissman, C. (1996). *Estudios de caso del impacto económico de la tecnología relacionada con el CIP en el Perú* (1era ed.). International Potato Center.
https://books.google.com.pe/books?id=OExQwr9_cjIC&printsec=frontcover&hl=es&source=gbg_ge_summary_r&cad=0#v=onepage&q&f=false