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IMPORTANCE OF MINING AND AGRICULTURE ON THE PERUVIAN ECONOMY

IMPORTANCIA DE LA MINERIA Y LA AGRICULTURA EN LA ECONOMÍA PERUANA

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ABSTRACT

This article presents the contribution of the mining, agricultural and other sectors to the Peruvian economy. It describes the performance of the mining and agricultural sectors during the last two decades, using macroeconomic indicators; In addition, it describes how in this period the Peruvian economy shows an impressive growth of 5.4% in terms of gross domestic product (GDP); This period is also known as the "mining boom". The excellent performance of mining and agriculture sectors contributed to this economic performance. However, despite the economic growth and changes during the last two decades, extreme poverty, malnutrition and childhood anemia are still a serious problem. To eliminate the extreme poverty Peru has to grow at least 6% per year in terms of GDP. This study proposes that mining and agriculture should continue to grow, as well as the other sectors to ensure Peruvian development. The recent recovery of the Peruvian economy is due to the latest

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mining investments and the interest of the current government in the promotion of private investments.

Palabras clave: *Agriculture, economic growth, mining, Peru, social conflict*.

RESUMEN

Este artículo presenta la contribución de los sectores minero, agrícola y otros a la economía peruana. Describe el desempeño de los sectores minero y agrícola, durante las últimas dos décadas, utilizando indicadores macroeconómicos; además, describe cómo en este período la economía peruana muestra un impresionante crecimiento del 5.4% en términos del producto interno bruto (PIB); este período también se conoce como el "boom minero". El excelente desempeño de los sectores minero y agrícola contribuyó a este desempeño económico. Sin embargo, a pesar del crecimiento económico y los cambios durante las últimas dos décadas, la pobreza extrema, la desnutrición y la anemia infantil siguen siendo un problema grave. Para eliminar la pobreza extrema, Perú tiene que crecer al menos 6% por año en términos del PIB. Este estudio propone que la minería y la agricultura deben seguir creciendo, así como los otros sectores para asegurar el desarrollo peruano. La reciente recuperación de la economía peruana se debe a las últimas inversiones mineras y por interés del gobierno actual en la promoción de las inversiones privadas

Palabras clave: *Agricultura, crecimiento económico, minería, Perú, conflicto social*.

1. INTRODUCTION

There is a believe that Mining and agriculture activities are in conflict, because they compete for land and water resources and environmental problems that has been causing the mining industry. This study presents data that mining and agriculture contributes to economic growth and they are not exclusive activities. The historic contribution to national GDP is estimate and published by INEI and BCRP. With this historical information by economic sector it is possible:

a. to measure the contribution of each economic activity to the Peruvian economy

b. It is also possible determine the rates of national economic growth, and the growth by each sector, for a given period.

c. Another indicator that helps to explain these changes are the investment, exports and social variables

d. Environmental negative effects are possible to reduce using modern technologies. Social conflicts are present, but this can be solved by good governance, such as: Corporate responsibility, appropriate intervention of the government.

To explain the socioeconomic situation of Peru, agriculture and mining sectors, several documents were reviewed, among them: (Lampadia, 2012) it presents the economic history of the Peruvian economy, using macroecomic indicators. From BCRP comes information about Net international reserves, national reserves, average inflation, gross investment growth, external public debt and historical information of GDP (BCRP 2017). World bank provides information about income per capita and the Peruvian agricultural situation

(Banco Mundial, 2017). INEI is in charge of national censuses, such as The agricultural census and population census about; besides uses the national surveys about: poverty and ENDES survey (INEI several publications). Data for the agricultural sector comes from (MINAGRI 2018) and data for mining analysis comes from (MINEN 2017 and 2018).

Taking all this data allow to understand the national and sectorial economy, as well allows us to see the economic cycle, inflation rate and the trend of economic growth in terms of GDP.

Recent Peruvian economic history

Peru is the third country with the largest territory in South America. The country has a great biodiversity and huge non-renewable resource in the Peruvian Andes. Peru is a country with a democratic system with problems of labor informality, corruption and low competitiveness.

This section compares three periods of the Peruvian economy: a) during the Alan Garcia first government - crisis at the end of 1989, b) the recovery of the Peruvian economy at the end of 2011 and c) the results of the economic at 2017. (Lampadia, 2012) BCRP, 2016. See table 1.

At the end of 1989, during the first government of Alan Garcia, the country was in a state of bankruptcy; all the indicators reflected that poor state of the Peruvian economy; the most representative indicator of this debacle was inflation that exceeded 1,000%.

From 1990 to 2011, GDP per capita grew from US $ 968 to US $ 5,772; in this same period, GDP growth went from -11.7% to 6.9% and monetary poverty and infant mortality was reduced from 58.7% to 27.8%, this is a reduction of 30.9 p.p. The Peruvian economy had been benefited by the "mining boom" during the last two decades. What made possible these changes? Most economist indicate that the new National Constitution and the new laws promoting new investments, created a new environment (INEI, 2016).

Table 1. Peru: main economic and social indicators between the years 1989, 2011 and 2017

Indicators	1989 end of impoverishment	2011 Results of prosperity	2017 Results
Net international reserves (millions of US $)	-105(julio1990)	48,800	63,600
GDP per capita (US$)	968	5,732	5,950 (2016)
National revenues (% of GDP)	3.8%	21.0%	18.0%
GDP growth (%)	-11.7	6.9	2.5
Average inflation (%)	1,187 (1980-1989)	25(2002-2011)	1.4
Gross investment growth (% of GDP)	-2.6%	10%	21.6
Poor population (monetary measure)	58.7%	27.8%	20.7% (2015)
Infant mortality (per thousand)	75	32 (2005-2010)	27 (2010-2015)
Child malnutrition (%)	40%	15%	14.4%
External public debt/GDP	60.8%	14.3%	15.3 %

Source: own elaboration, based on INEI, BCRP, World Bank, INEI and Lampadia

From 2011 to 2017, there is an economic slowdown as a result of: a) the fluctuation in the international prices (decline) b) the poor management of Ollanta Humala and PPK governments, due to issues of bureaucracy and indifference to solve social conflicts. In this period, the GDP growth rate decreased from 6.9%

to 2.9% and the external debt / GDP ratio increased from 14.3 % to 15 .2%. In this same period, monetary poverty has been reduced by 6.0% in p.p. However, there are still areas in the country, where social anomalies are present as: infantile anemia and chronic child malnutrition.

Peruvian GDP increased by 2.5% (in 2017); we need to grow at least at 6%, to generate new jobs and eradicate poverty. See figure 1. During the first months of 2017, the country faced floods and "huaicos" which are landslides in the north of the country, known as the "niño costero", which caused economic losses and deaths.

The study uses macroeconomic indicators some of them are: GDP, export, investment and others, the secondary information comes from: MEF, BCRP, SUNAT, MINAGRI, MIMEN and ADEX. The basic analysis is with graphics across the last two centuries, to see the trends and make inferences. It uses also correlation analysis among the main variables, to see if the correlation is positive or negative and the grade of correlation. Finally, a regression analysis is performed to measure the contribution of the main sectors. The review of literature is done about the Peruvian economy, mining and agriculture.

The objective of this study is to remark the mining and agriculture sectors contribution to the Peruvian economy. For this purpose, the performance of the Peruvian economy is described during the last two decades; using macroeconomic indicator's such as GDP, export value and investment. The hypothesis is**:** the contribution of mining and agriculture are relevant to the development of Peruvian economy.

2. MATERIALS AND MÉTHOS

2.1 Type of study.

This study is comparative and historical. It uses historical data (time series) of macroeconomic variables as well sectorial and social variables; also, it is comparative in two moments the Peruvian economy.

2.2 Instruments used in data collection.

It uses secondary data published by several governmental institutions and by private research institutes. The data comes from national censuses and national surveys on poverty and social conditions of the country.

2.3 Estimation methodology.

The study presents the data in tables and graphs across the last two decades, by main variables; rates of growth were estimated for each of variables in analysis; also, multiple correlation was run among variables. Finally, a regression analysis was performed to see the contribution of key variables to the growth of the economy.

3. RESULTS

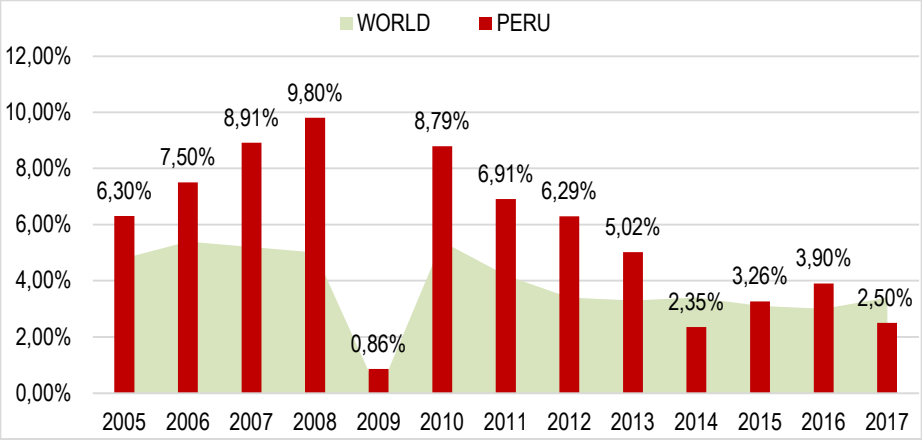
3.1 Macroeconomic variables

Gross Domestic Product (GDP)

The average annual GDP growth of Peru between 2005 and 2017 has been 5.6 %; however, this rate was higher than the world growth rate. The GDP in

2017 increased only on 2.5%. See Figure 1. Several forecasts indicate that this year 2018, the GDP will grow around 4%.

Figure 1. Peru and world: Growth of GDP, 2005 -2017



Source: UNCTAD, BCRP, Macroconsult

GDP according to productive sectors

Table 2. Peru: GDP by economic sectors, 2008 – 2016
(S/ million soles of 2007)

Sectors Years	2008	2009	2010	2011	2012	2013	2014	2015	2016
Agriculture	20,600	20,873	21,766	22,658	23,991	24,362	24,814	25,614	26,124
Fishing	2,436	2,352	1,891	2,892	1,960	2,445	1,762	2,042	1,836
Mining	49,599	50,076	50,714	51,043	52,473	55,035	54,554	59,715	69,442
Manufacture	57,354	53,502	59,255	64,330	65,265	68,508	66,047	65,079	64,107
Electricity and Water	5,950	6,013	6,501	6,994	7,401	7,811	8,193	8,679	9,313
Construction	19,061	20,360	23,993	24,848	28,779	31,356	31,960	30,101	29,154
Commerce	36,105	35,936	40,420	44,034	47,218	49,984	52,193	54,217	55,199
Services	157,818	163,472	177,840	190,253	204,186	216,864	227,756	237,351	246,524

Source: BCRP.

GDP is the total value of goods and services produced in different sectors of the economy in a given country. In the last 10 years (2007-2016), the sectors that have contributed most to the composition of GDP in Peru has been: services 47.4%, followed by manufacturing 14.8%, mining 13.0%, commerce 10.8%, construction 6.2%, and the agricultural sector 5.5%. Note that 18.5% of Peruvian GDP is made up of agriculture and mining, in recent years. See table 2.

The annual average growth rate

The annual average growth rate by economic sectors, are different in the last 10 years. For example, the fishing sector, presents years with great positive rate and years with negative growth rate. Mining presents an average growth rate of 3.47%. The majority follows the trend of national GDP growth (5.05%). (See table 3).

Table 3. Peru: Annual average GDP, contribution by sector to GDP and annual average growth rate of GDP. 2007–2016. Million soles of 2007.

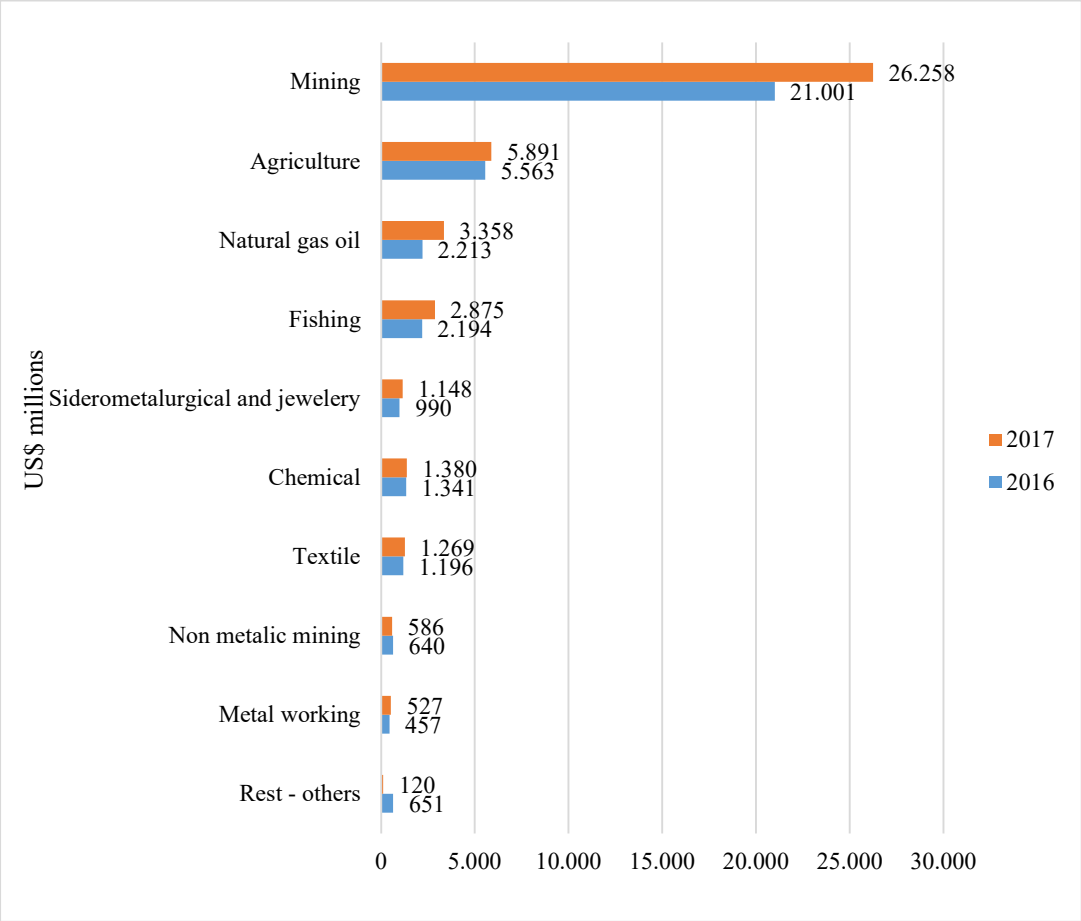
	GDP, Average of last 10 years 2007-2016 (S /. million)	Contribution of the sectors to GDP (porcentaje)	Growth rate of average annual GDP 2007-2016 (%)
Agriculture	25,286	5.54	3.4
Fishing	2,418	0.53	-2.77
Mining	59,240	12.98	3.47
Manufacture	67,788	14.85	2.5
Electricity and Water	7,960	1.74	5.78
Construction	28,152	6.17	6.19
Commerce	49,263	10.79	6.17
Services	216,399	47.40	3.47
GDP	**456,505**	**100.0**	**5.05**

Source: Own elaboration, based on INEI 2017 data

Peruvian exports

The Peruvian export is very diverse, including mining, agricultures products, natural gas and oil, fishing among the main ones. The mining sector contribute with 60.4% fallowed by agriculture 13.6%. Both make up 74% of total export. See figure 2.

Figure 2. Peru: Value of exports 2016 and 2017

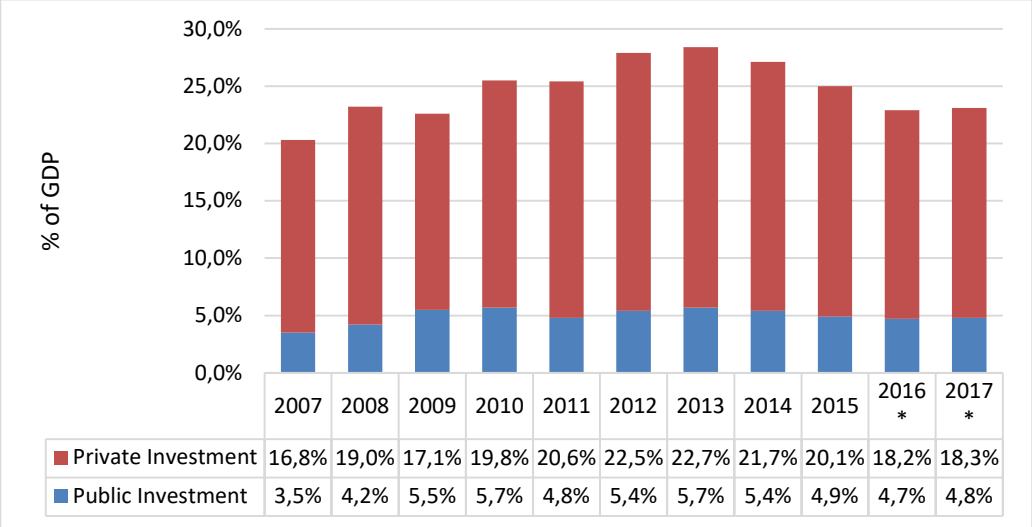


Source: SUNAT/ Nation Bank

Public and private investment

In the last 11 years, the sum of private and public investment per year on average was 24.7 % of GDP. In 2017, total investment reached 23.1% of GDP, of which 18.3% was private investment and the difference of 4.8% was public investment. See figure 3.

Figure 3. Peru: Public and private investment as a percentage of GDP, 2008-2017



	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016 *	2017 *
Private Investment	16,8%	19,0%	17,1%	19,8%	20,6%	22,5%	22,7%	21,7%	20,1%	18,2%	18,3%
Public Investment	3,5%	4,2%	5,5%	5,7%	4,8%	5,4%	5,7%	5,4%	4,9%	4,7%	4,8%

*Source: BCRP. * Cifras estimadas. BCRP (Reporte de Inflación, diciembre 2016)*

With no investment, there is no economic growth and the country will have serious problems, because investment means the growth of mining, agriculture, fishing, manufacturing and other economic sectors, in addition to enabling the construction of infrastructure, that is, investment boosts the economy, generates jobs and taxes for the state; people consume and can keep their children healthy and educate them properly.

The north of Peru was affected by natural disasters meanly flood of rivers, part of infrastructure was destroyed. The central government assigned S/. 27,000 million, to be invested in the next three years. Another important event coming is the Pan American Games, which has a budget of S/ 4,000 million. The Peruvian portfolio of investment for 2017 -2022 will be in: mining, hydrocarbons (especially gas), energy, a transport (roads, railways, bridges), irrigation works, among others. See table 4.

Table 4. Peru: Portfolio of investment (2017-2022)

Sectors	Projects	
	Quantity	**Million US$**
Private investment		
Mining	48	51,102
Hydrocarbons	10	19,339
Electricity	48	8,217
Transport	17	8,725
Other sectors	76	8,665
Private public investment		
Private public asociation	31	14,692
Works for tax	46	222
Public investment		
Public investment projects	65	3,724
Total	**341**	**114,686**

Source: Romulo Mucho 2018.

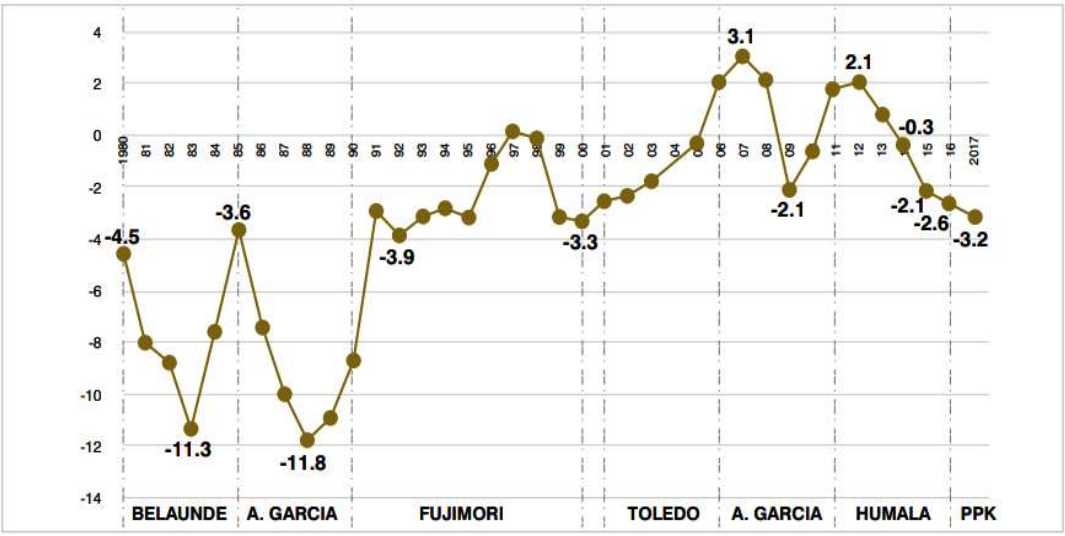
Fiscal deficit

Peru in 2017 closed with a fiscal deficit of 3.2% of GDP, which means S/. 22,000 million; this could be seen as a broken country. See figure 4. The tax

collection in 2017 reached the lowest point, 12.9% of GDP, when the average historical ratio was 15% and 16%.

This means that there will be difficulties to satisfy the social basic needs. The only way to overcome this deficit is generating more wealth. The budget for 2018 is S/. 157,000 million; this amount will not be enough to cover the needs of the country, then the other alternatives are to increase taxes, or ask for loans, both of them are dangerous alternatives.

Figure 4. Peru: Fiscal Deficit (% OF GDP)



Source: BCRP

3.2 Peruvian mining sector

Production

The Peruvian portfolio of production of metal is diverse. The main metals produced are: Copper, Gold, Zinc, Silver, Lead, and tin. In general, the volume

of production has grown significantly during the last two decades. However, the prices fluctuate, some periods could positive or negative. See table 5.

In terms of GDP the mining sector, registered an annual average growth of 4.7 %, in the last 20 years. The last increase in copper production mainly are due to the start-up of Las Bambas and the expansion of Cerro Verde, but also due to other mining operations such as Constancia, Toromocho, Antapaccay and the expansion of Antamina, which had a significant increase in their production. The growth of copper production is impressive, particularly in the last three years. This growth made it possible for Peru to move from third (in 2015) to second, displacing China in the copper production table worldwide (MINEM, 2016).

Table 5. Peru: Metal mining production by main products, 2016-2017.

METALS	Unit	2016	2017	% Var. 2017/2016
Copper	*(TMF)*	2,353,859	2,445,585	3.90%
Gold	*(Grs.f.)*	153,005,897	151,103,938	-1.24%
Zinc	*(TMF)*	1,337,081	1,473,037	10.17%
Silver	*(Kg.f.)*	4,375,337	4,303,541	-1.64%
Lead	*(TMF)*	314,422	306,794	-2.43%
Iron	*(TMF)*	7,663,124	8,806,452	14.92%
Molybdenum	*(TMF)*	25,757	28,141	9.26%
Tin	*(TMF)*	18,789	17,790	-5.32%
Arsenic	*(TMF)*	23,252	22,319	-4.01%
Manganese	*(TMF)*	1,194	1,133	-5.09%
Bismuth	*(TMF)*	188	124	-34.01%
Tungsten	*(TMF)*	0	0	-16.16%

Data 2017 – January November
Source: DIRECCIÓN GENERAL DE MINERÍA - DPM - Dirección de Promoción Minera

MINSUR is the main producer of tin, it will expand its investment in Bofedal 2, with the recovery of tailings from operations in San Rafael by 2018. This means a significant increase in its production, for which it plans to an investment of 165 million soles

MINEM forecasts, that production of metals in 2018 will be strengthened by the start of new operations and / or extensions. The start of production is planned for the Cuajone expansions (100,000 TMF - Cu / year), Bayóvar (3.9 thousand TM Phosphates / Year) and Marcona (3,500 TM Fe / year), activities that together represent an investment of US $ 3,220 million. In addition, the start of operation of Minera IRL is expected in its Ollachea project in Puno, with an annual gold production of 30 thousand ounces and an investment of US $ 180 million. Milpo (now NEXA Resources) plans to start two new operations; Pukaqaqa and Magistral, which are located in Huancavelica and Ancash, respectively. Between both operations, the investment exceeds US $ 1,000 million and is expected to produce 40,000 and 60,000 fine tons of copper per year. Likewise, these operations would represent 4.2% of the current national copper production (MINEM, 2016).

Mining reserves

At Latin America level Peru, has the largest reserves of gold, zinc, and lead. Also, Peru has large reserves at world level of silver, copper and zinc. (USGS, 2017). See table 6.

Table 6. Perú: Metal reserves, 2017

Metal	Latin-American	World	Unit of measurement	Reserves	World reserves (%)
Silver	2	2	TM	93,000	17.6
Gold	1	6	TM	2,300	4.3
Copper	2	2	Miles de TM	81,000	10.3
Zinc	1	2	Miles de TM	28,000	12.2
Lead	1	4	Miles de TM	6,000	6.8
Molybdenum	2	4	Miles de TM	2200	12.9
Tin	2	5	TM	105,000	2.1

Source: MINEM, (US Geological Survey, 2018)

Mining investment and future portfolio

The mining investment in 2017 was US $ 4,921 million; the mining sector presents the largest private investment in Peru. However, the estimated portfolio of mining investment, for 2017 – 2022 has 49 major projects, with an expected investment of US$ 58,508 million, this figure is dynamic since the CAPEX20 (Investments in Capital Goods) costs usually increases every year. The execution of these projects will give a great impetus to the Peruvian economy, creating new direct and indirect jobs and contributing to export value. See table 7.

Table 7. Peru: Portfolio of Mining investment, year 2018 (US $ million)

Year	Start produccion	Project Name	Company	Region	Metal	Advancement Stage	Investment
In Construction	2018	Toquepala Expansion	Southern Perú Copper Corporation,	Tacna	Cu	construction	1,255
	2018	Marcona Expansion	Shougang Hierro Peru	Ica	Fe	construction	1,300
	2018	Shahuindo Expansion	Shahuindo	Cajamarca	Au	construction	109
2018	2021	Pachapaqui Expansion	ICM Pachapaqui	Áncash	Zn	Feasibility	117
	2020	Toromocho Expansion	Minera Chinalco Perú	Junín	Cu	Feasibility	1,300
	2020	Ariana	Ariana Operaciones Mineras	Junín	Cu	Engineering Study	125
	2021	Corani	Bear Creek Mining	Puno	Ag	Engineering Study	585
	2021	Mina Justa	Marcobre	Ica	Cu	Engineering Study	1,348
	2022	Pampa del Pongo	Jinzhao Mining Perú	Arequipa	Fe	Engineering Study	2,500
	2019	Quecher Main	Minera Yanacocha	Cajamarca	Au	Engineering Study	300
	2022	Quellaveco	Anglo American Quellaveco	Moquegua	Cu	Engineering Study	4,882
	2020	Relaves B2 San Rafael	Minsur	Puno	Sn	Engineering Study	200
Subtotal		12					14,021
Others		37					44,487
Grand Total		**49 Projects**					**58,508**

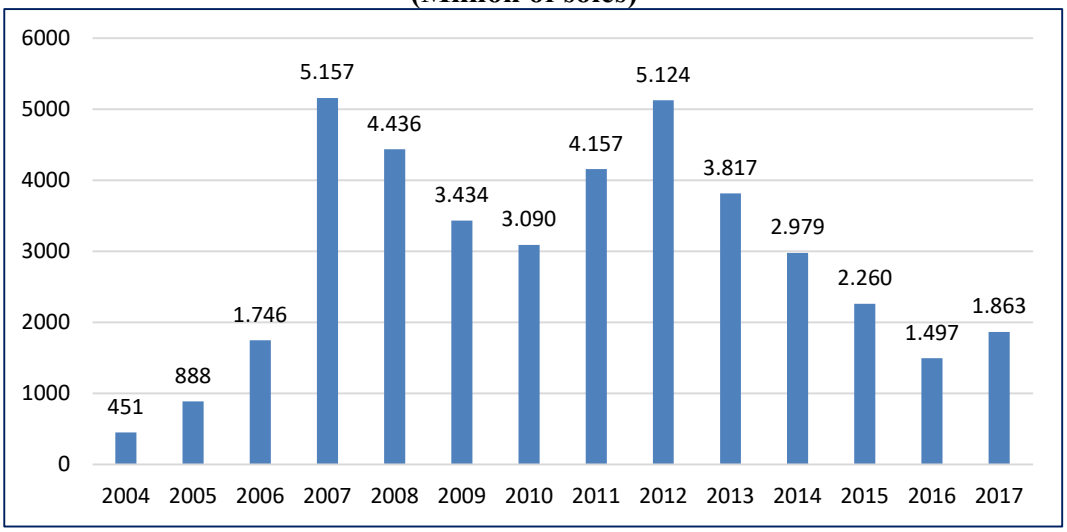
Source: MINEM 2017.

Mining tax “canon minero”

A significant contribution of the mining sector to the Peruvian economy is the “Canon minero”. It consists of 50% of the Income Tax (IR) of the third category that the mining companies pays annually. Other mining companies, in addition to the contribution that the Mining Canon, voluntarily assign a "Social Development Funds".

The National Society of Petroleum and Energy Mining, states that during the last 23 years, 44,999 million soles have been transferred to local and regional governments, universities and state institutes (SNMPE, 2018). The transfer of "canon minero" of 2018 presents a significant increase, compared to previous year (1863 to 3,158 million soles).

Figure 5. Peru: Transfer of ¨Canon Minero¨, 1996-2017
(Million of soles)



Sources: Sociedad Nacional de Minería, Petróleo y Energía del Perú, 2017. Report Canon Minero. Transferencias 2017. P2

However, the use of Mining Canon has not best been the best in some cases it has contributed to the "inequality" between regions and they were not used as investment. Figure 5 presents resources generated in the mining sector, measured a "canon minero". The transfer is to central, regional and local government.

Discovery of lithium

The latest discovery of lithium in Macusani, Carabaya has been a world news. This finding, achieved by Macusani Yellowcake, a subsidiary of Canada's Plateau Energy Metals, of a high-grade lithium (Li) deposit (3,500 parts per million), is undoubtedly good news for Puno.

The company has reported a volume of 2.5 million tons of high grade lithium ore in a first stage of exploration, with further exploration the tonnage would be much higher.

Lithium is usually found in salt pans ... mainly in natural brine, pegmatite, geothermal fields. It is the lightest metal that presents excellent conditions in the conduction of heat and electricity. Li2CO3 lithium carbonate is the product with the highest commercial transaction volume, making it the most important compound in the international market ".

The discovery of lithium in Puno is of rocky origin similar to other deposits found in rock, such as the origin of lithium from Australia and the USA among others.

It opens the possibility of turning Peru into one of the main producers of this alkaline metal, whose industrial application grows progressively.

So far, Chile, Australia and Argentina, are the countries that export this product the most and 90% of the refineries are in China, however, as a result of this discovery, Peru would also become one of the biggest players in the country. World Market.

Lithium is not negotiated like other metals, but directly between producer and client, it began to be used for batteries at the beginning of the 90's. The appearance of the electric car and the development of batteries for technological products has increased the World demand, however, this metal has many other applications as in agriculture and medicine. At the beginning of the 90 the use of lithium battery was 6% of the demand of the metal, today it skirts 40% of the total, for the 2021, it is projected that 59% of the total will be destined to batteries of automobiles and electronic devices. We know that each smart phone requires between two and three grams of lithium, the electric car requires 45 Kg. And an electric bus almost 240 Kg, then an extraordinary leap in the demand of the metal is generated.

In 2015, the value of lithium was quoted at US $ 5851 per ton on average, in 2017 it gave a huge jump at US $ 12,500, and in July 2018, its price already exceeded by more than 20% per ton, everything indicates that the price of the metal will continue to grow.

According to the executives of the company, with an investment of US $ 800 million, Peru can start exporting lithium carbonate for US $ 500 million per year starting in 2021 if the Macusani project is launched, the plan would be to start with a production of 40,000 tons of lithium carbonate, with the projection of reaching 100,000 per year.

Producing lithium as raw material is not enough, it must be exported with added value. The prospects for industrialization are excellent, it is needed a lithium refinery; beside added value must be created, by producing batteries,

electric cars and other products that use lithium as input. Since it is an alkaline metal, the risks of contamination are minimal.

Therefore, the government must provide the legal and regulation related to the production of lithium and uranium. It is expected that lithium will have a large and positive economic and social impact in Puno and Peru.

3.3 Agriculture sector

The agricultural is important for two reasons: it provides products for food security and generates direct jobs. This sector contributes to 5.3% of total GDP, employs 24% of population economically active and contributes to total exports in 20%. Peruvian agriculture is a very important sector and must keep investment in new irrigated areas, transfer agricultural technologies to farmers and generate new technologies via: research, development and innovation (R+ D+ i).

A study of the Peruvian agriculture performed by World Bank says that agriculture has linkage (impact) with the rest of Peruvian economy. The same study indicates that agriculture contribution to GNP is higher than official reports. The Peruvian agriculture is composed of several types of producers, from the agriculture for exporting, family agriculture and agriculture of subsistence. However, the agriculture sector will continue as a one of main engines to move the Peruvian economy. ((Banco Mundial, 2017).

Main crops

Peru is rich in biodiversity, therefore the number of crops are many and it is composed of transitory and permanent crops. The cycle of permanent crops is less than 12 months (cereals, vegetables, etc.); on the contrary, permanent crops takes 4 to 5 years before production and requires higher amounts of investment. This most important transitory crops are: potatoes, hard yellow corn, starchy corn and rice among others. The main permanent crops are composed of coffee, banana, and cocoa. See tables 8 and 9.

Table 8. Peru: Area of transitory Crops, (agricultural census 2012)

Crops	Census 2012 Area, hectare	2016/2017 planted area, hectare
Potatoes	367,692	319,712
Hard yellow corn	261,577	273,935
Amyllacid corn	240,809	196,856
Rice	167,093	437,099
Sugar cane	141,558	77,525
Yucca	94,646	105,964
Corn corn	66,002	42,932
Forrage oats	51,253	92,871
Forrage barley		22,137
Bean	45,787	89,902
Grain barley	45,367	143,479
quinua		63,329
Others	431,205	
Total	**1,912,989**	

Source: Agricultural Census 2012 CENAGRO.

Table 9. Peru: Area with permanent crops, (agricultural census 2012)

Crops	2012 Area (ha), Census data	2017 Area (ha)
Coffee	425,416	424,129
Banana	145,737	160,610
Cocoa	144,232	147,304
Avocado	65,658	39,629
Vinegards	43,820	29,777
Asparagus	39,629	32,365
Mango	39,036	28,230
Oil palm	26,740	58,951
Orange tree	22,48	31,380
Chirimoyo	18,119	3,609
Lemon		24,740
olive		21,185
Others	263,765	
Total	**1,234,633**	**Total**

Source: Agricultural census 2012 CENAGRO.

Livestock

According to MINAGRI data, the number of the animals from 1912 to 2017 presents a significant increase for ovine, porcine, alpacas, lamas and caprine species. However, the inter census data for 1994 – 1912 presents a decrease in ovine, lamas an equine number of heads. This inter census shows an impressive increase of broilers (93%) also shows an impressive increase of guinea pigs and rabbits. See table 10.

Table 10. Peru: units with animals (Agricultural census 2012)

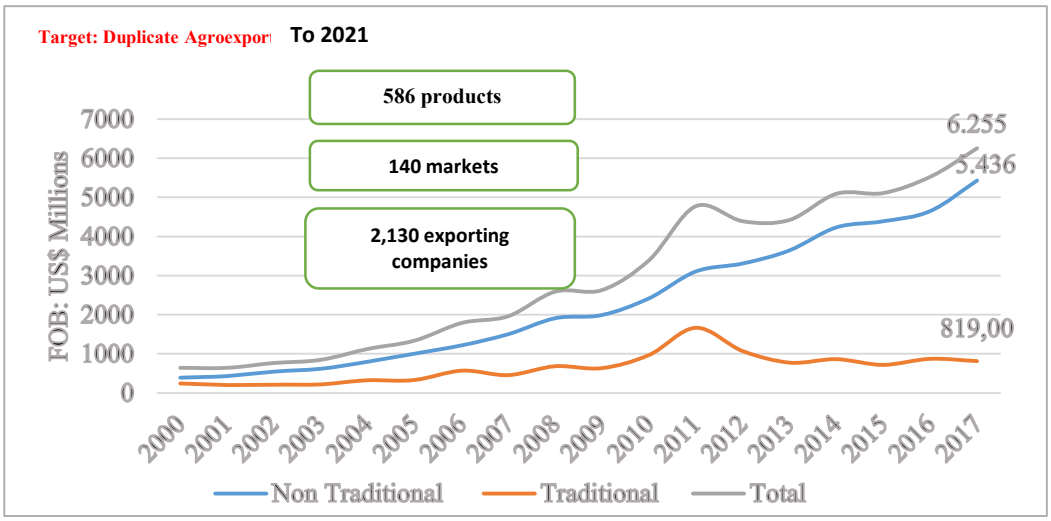
Type of Cattle	2012 Number of heads	2017 Number of heads	%, variation heads, Inter census, % 1994-2012
Bovine	5,156,044	5,535,569	14.7
Ovine	9,523,198	11,338,424	-21.2
Porcine	2,224,295	3,187,254	1.7
Alpacas	3,685,516	4,330,710	50
Lamas	746,269	1,106,201	-25.8
Equine	1,260,219	n.a	-42.1
Caprine	1,038,109	1,814,359	-50
Minor animals			
Guinea pigs and rabbits	12,695,030	n.a.	84.4
Chickens and broilers	92,017,474	n.a	93.2
Chickens	23'455,264	n.a.	13

Source: Agricultural census 2012. CENAGRO and MINAGRI

Agricultural exports

The agriculture export is composed of traditional and nontraditional exports. The nontraditional product shows an impressive growth and they have some degree of value added (packing, selection and others), this group of agro exports products is composed of: grapes, blueberries, mango, avocado, asparagus, passion fruit, artichoke, quinoa and other, with international demand. On the contrary the traditional agricultural exports have a minimum of increase. See figure 6.

Figure 6. Peru: Agricultural exports



Source: BCRP, SUNAT, MINCETUR and Business
Figure 4 - Peru: Agricultural exports by traditional and nontraditional, 1995 - 2017, (Millions of US$)

Position of Peru in the world agro-export market

Peru has managed to take the first places in exports of some agricultural products. By 2016 we have passed the first place in the export of quinoa, peeled Brazil nuts and fresh avocado. In the case of blueberries passed from the thirty-ninth place in 2011 to the third place in 2016. Peru occupies the tenth place among the countries that feed the world. See table 11.

Table 11 - Peru: World ranking of agricultural export products, 2011 and 2016.

Product	World position 2011	World position 2016
Quinoa	4	1
Brazil nuts peeled	2	1
Fresh asparagus	1	1
Fresh avocado	5	2
Bluberries	39	3
Fresh mangoes	5	3
Cocoa beans	12	4
Fresh grapes	7	5
Fresh tangirines and tangelo	11	7
Organic banana	15	9
Fresh pomagranates	29	11

Source: BCRP

Table 12. Peru: Export of agricultural products 2016 (US $ million FOB)

Agricultural Products	2016	2017
Coffee	619.5	626.5
Grapes	645.4	573.3
Avocados	300.6	426.6
Asparagus	399.2	331.9
Blueberries	262.2	331.9
Mangoes and Mangostanles	267.5	254.9
Others	*3,069*	*3,346*
Total	*5,563*	*5,891*

SOURCE: SUNAT / INEI

3.4 *Social conflicts*

Historically, mining has affected the environment, leaving mining liabilities. Today there are well-developed technologies to make a clean mining that mitigate and control their environmental impacts. Applying these technologies and standards, well-made mining should not cause negative impacts.

Orihuela (2013) summarizes the social conflicts that have plagued the country between mining and other sectors. It concludes that the more mining there is, the greater the social conflicts.

Likewise, there have been reports of social conflicts in mining areas, which has delayed investments in exploration and mining operations; but many of these are not due to the mining - agriculture conflict over the use of natural water and land resources, but because of the imperfect distribution of income between the mining companies and the population around the mines.

According to ANA, the consumptive use of the quantity of water resources by mining is lower (2%) than in other economic activities; being the main user the agriculture and the use by the population.

For three days from June 6 to 8, 2018, the AGROMINERA Convention called AGROMIN was held, under the slogan "Agriculture and Mining united by nature", together with the main actors that drive the economy and employment in our country.

In this event there have been representatives from the mining and agriculture sectors, researchers, public sector officials and international guests; the topics dealt with were: Territorial Planning, education, unemployment generation, the potential of natural resources, corporate social responsibility, the location of water resources and their use to increase water supply, the

participation of mining and agro-exporting companies, and the ways and mechanisms how social conflicts are solved in other countries.

According to the various reports, it is evident that social conflicts will be less, due to corporate responsibility, better use of the mining canon and the participation of the state in preventing any of the organized conflicts. Most of the papers conclude that the synergy between mining and agriculture will be present for the development of the country.

4. CONCLUSIONES

The Peruvian economy depends on mining and agriculture activities. National GDP is highly and positively correlated and with mining GDP.

In year 2017, the mining sector contributed with 13.9 % of GDP and 58% of Peruvian export (S$ 26,258 million). The increase of international prices of metals such as copper are good news. The mining production in Peru is increasing, and that this trend will continue.

The agricultural sector provides food for food security. This sector contributes to 5.3 % of total GDP, employs 23.5 % of population economically active and contributes with 19.8 % (US$ 5,550 million) of total export. The Peruvian agriculture is composed of family (small and poor) agriculture and agro export groups. The exporting of agricultural products is growing; however, the agriculture at family level requires more access to land, water, technical

assistance, to credit and access to technologies to give added value to their produce.

Since mining is financing the development of Peru and agriculture contributes to food security and export. It must be a national policy to promote the development of mining and agriculture for the national development. Taken in account the environmental issue and uses of water and land.

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ANNEX

Annex A. Peru: Metal mining production of main metals, 2001 2017

Product	Copper	Zinc	Gold	Silver	Lead	'Iron	Tin	Molybdenum
Year	(MTF)	(MTF)	fine ounce	fine ounce	(MTF)	(MTF)	(MTF)	(MTF)
2001	722 355	1 056 629	4 453 572	82 662 900	289 546	3 038 401	38 182	9 499
2002	844 553	1 232 997	5 064 684	92 260 670	305 651	3 056 055	38 815	8 613
2003	842 605	1 373 792	5 549 989	93 998 328	309 164	3 484 900	40 202	9 590
2004	1 035 574	1 209 006	5 569 253	98 375 456	306 211	4 247 174	41 613	14 246
2005	1 009 899	1 201 671	6 687 384	103 064 366	319 368	4 564 989	42 145	17 325
2006	1 048 472	1 203 364	6 520 845	111 583 908	313 332	4 784 601	38 470	17 209
2007	1 190 274	1 444 361	5 473 188	112 574 169	329 165	5 103 597	39 019	16 787
2008	1 267 956	1 602 597	5 783 000	118 505 431	345 109	5 160 707	39 037	16 721
2009	1 275 889	1 512 931	5 915 000	126 118 001	302 459	4 418 768	37 503	12 297
2010	1 247 183	1 470 450	5 275 000	117 043 680	261 990	6 042 644	33 848	17 000
2011	1 235 110	1 256 383	5 342 000	109 918 968	230 199	7 010 938	28 882	19 000
2012	1 298 763	1 281 282	5 194 000	111 912 146	249 236	6 684 539	26 105	17 000
2013	1 375 639	1 351 273	5 024 000	118 130 924	266 472	6 680 659	23 668	18 000
2014	1 377 642	1 315 475	4 504 224	123 325 872	277 294	7 192 592	23 105	17 018
2015	1 700 817	1 421 218	4 720 466	131 868 462	315 525	7 320 807	19 511	20 153
2016	2 353 859	1 336 835	4 919 244	140 638 796	314 174	7 663 124	18 789	25 757
2017	2 445 585	1 473 037	5 329 945	151 103 938	306 794	8 806 452	17 790	28 141

Source: DIRECCIÓN GENERAL DE MINERÍA - DPM - Dirección de Promoción Minera