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Sector Study Pig Chain Argentina

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AGRIVALUE S.A.
INTERNATIONAL BUSINESS CONSULTING

**MARKET SECTOR REPORT
ARGENTINE PIG PRODUCTION, PROCESSING AND MARKETING
IN A GLOBAL CONTEXT**

“Opportunities for Dutch and Argentine cooperation”



NETHERLANDS ENTERPRISE AGENCY



Netherlands Enterprise Agency

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Disclaimer

The purpose of this report is to supply an up-to-date overview of the Argentine pig production and processing chain within an international context and identify potential areas of knowledge and technology interchange between the Dutch and Argentine pig sector.

To put the Argentine pig sector within a global perspective this report has been prepared based on interviews with stakeholders within the (inter)national pig industry and refers to many different sources including a compilation of publicly available market information published by third parties.

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INTRODUCTION BY THE DUTCH AGRICULTURAL COUNSELLOR IN ARGENTINA

Argentina, the land of Malbec, steak, tango and extensive Pampas. But there is more to it: an often-turbulent economy, export sectors that need to provide for much needed dollars, and an agricultural sector that plays a crucial role in this.

An increasing interest, as well in production as in consumption, in the porcine sector has been noticed over the past years in Argentina. This value chain is well underway into developing itself into a more and more important one. Market demands for animal protein both for internal and external consumption have risen over the past years. The country has also opened several export markets. Argentina is definitely a very interesting country for this value chain, as feed is present from the extensive fields, and there is literally room to grow.

So, what is needed to expand this sector in a sustainable way?

With the development of this sector and the Dutch experience in it in mind, the Netherlands Enterprise Agency and the agricultural counselor of the Dutch embassy in Buenos Aires commissioned a study. Because: where better to look for expertise and collaboration partners than in The Netherlands? The results of that study are reflected in this extensive report, bringing you the ins and outs of the Argentine porcine value chain.

I am very pleased with the work Agrivalue has delivered with this report. And I am convinced it will serve the Netherlands agri-business in this value chain as a guide into not only the context and the doing business, but also into finding their opportunities in Argentina.

Circular agriculture can find its place in this extensive country in the porcine sector. It is a most suitable sector for this, and Dutch expertise, knowledge and hands-on mentality are very welcome to develop this sector in an even better direction.

I hope you will enjoy reading this report, and we look forward to receiving your feedback, and to receiving you in Argentina.

Cordial saludo,

Léontine Crisson
Agricultural counselor, the Netherlands Embassy in Argentina

EXECUTIVE SUMMARY

The Argentine pork chain has numerous competitive advantages such as the availability of water, corn and soybeans, a favourable climate, a lack of sanitary threats, a critical mass of people with high technical and professional level and a huge potential for sustainable large scale production and a culture of high animal-proteins consumption.

The Argentine pig production activity has experienced an important growth in the last years. Although the sector is still relatively small, the country's natural conditions enable the sector to respond to the increasing internal consumption demand, replace imports to become self-sufficient and even focus on export. Argentina is the only country in the world that exports about 60% of the feed grains it produces and 90% of soybeans (source of energy and protein respectively). These factors suggest that Argentine pig production will maintain the trend of growth marked in the last 10 years.

Table 1 Indicators of the Argentina Pork Market (2018)¹

Activity	Quantity	Unit
Primary production operations	4.900	Farms
Sow herd	361.227	Head
Slaughtered	6.778.976	Head
Production	620.549	Metric tons carcass weight
Import	45.154	Metric tons
Import	123.954	Thousand US\$
Export	23.228	Metric Tons
Export	38.940	Thousand US\$
Consumption	660.513	Metric Tons
Consumption per capita	14,84	Kg. / inhab. / year

(Source: Agrivalue SA based on AAPP, GITEP, MINAP and INDEC)

The Argentine pig health level is internationally recognized as very good. The country is free of the main diseases that affect the species such as Classical swine fever, PRRS (porcine reproductive and respiratory syndrome) and Aujeszky's disease. Sanitary regulations are complied with and there are numerous controls on trichinosis, influenza virus, aphthous fever and tuberculosis.

The estimated on average feed-to-pork conversion rate factor is 3.7. If 60% of the diet of pigs in Argentina contains corn, in 2018 the consumption of corn by the pig sector would have reached 1.3 million tons.

The territorial distribution of primary pig production establishments (animal husbandry) marks its highest concentration in the north of the province of Buenos Aires, south of Santa Fe and the centre of Córdoba and Entre Ríos. These locations correspond to the main corn production areas and count on many compound feed facilities.

The professional Argentine pig production sector is also highly concentrated. The 46 largest establishments (> 1.000 sows), represent only 1% of the total pig production establishments, but have 26% of the total sow herd (94.375 sows out of total national sow stock of 361.227 heads) and participate for 28,7% of the total amount of heads sent to slaughter (1.9 million pigs) .

¹ Secretaría de Agroindustria - Evolución Mensual y anual de los indicadores Argentina 2018

Most Argentine pig producers, 73% of the total, (about 3.500 farms in 2018) have very low-scale production systems. These small farmers sent less than 500 heads to slaughter on a yearly basis, which is equivalent to an average of 1.5 heads daily. These small-scale systems do not allow the incorporation of state-of-the-art technology and more efficient systems, hinder the standardization of quality (meat), have a higher negotiation cost and higher tax informality.

In 2018 only 28% of pig farmers (around 1.500 farms) counted for 93,4% of the total production in Argentina. This atomization prevents the development of a more aggressive export strategy, as the problem is that the international meat market demands large volumes (often concentrated in a few cuts), with constant supply, to be able to close agreements with distributors and commercial channels. Currently there are private sector initiatives to enable the entrance to export markets in an associative way.

In 2018, 6.1 million heads were slaughtered in the territory of Buenos Aires, Santa Fe and Cordoba, when only 0.6 million more were slaughtered in the rest of the country. Argentine production in carcass weight equivalent, was 620.549 MT in 2018 an increase of more than 9% compared to the year before. The slaughter volume has been growing in recent years at an 8% rate.

Currently Argentina has 208 pig processing establishments in the country, which are distributed among national slaughterhouses, municipal slaughterhouses and rural slaughterhouses. The slaughtering establishments and pork sausage industries are linked to the territorial configuration of the primary activity and the consumption centres. The production of pork meat is destined, for the most part, to the domestic market. Approximately 40% of the total production is produced by five establishments, which have the highest industrial and technological development in the sector. Four of these are in the Province of Buenos Aires.

The main destiny of the meat obtained after slaughter is the elaboration of cold cuts and sausages, and in the case of the pigs of the category piglets the main destiny is the fresh consumption.

Considering the total volume of establishments of 4.963 productive units in 2018, we can see there is a high heterogeneity of actors. This shows that there is an important presence of small producers in the primary and industrial stages. They coexist with larger intensive establishments, with modern technology and better sanitary conditions, which have integrated the primary and industrial stages.

Pork is relatively expensive in Argentina compared with other meats, so it is essential to achieve efficiency gains and productivity. This situation poses a high heterogeneity in technological and productive patterns, which requires active intervention of the public sector to generate innovation processes in the smaller establishments, in order to achieve higher levels of efficiency in that business segment.² The sector does face a problem related to value added tax that discourages new investments, and which demands an urgent solution.

In Argentina it is currently recognized that one of the most important criteria to evaluate the quality of pig meat is the muscle content or the proportion of lean tissue. This quality criteria value improved from 47% in 2011 to almost 57% in 2018.

In 2018 the consumption of pork in Argentina reached 14,8 kg/capita/year, divided into 11 kg of fresh meat and 3 kg of cold cuts and sausages. For 2019 consumption is expected to reach even more than 15 kg per person an increase of more than 8 kg compared with 20 years ago. This figure shows

² Ministerio de Agroindustria – Análisis Prospectivo

Argentina has one of the highest growth rates in the world, only Colombia, Angola and Vietnam exceed Argentina's annual average 5%-rate of increase³.

Seven entities of the Pig Sector of Argentina: the Argentine Association of Pig Producers (AAPP), the Association of Pig Producers of Santa Fe (APPORSAFE), the Chamber of Pig Producers of Córdoba (CAPPOR), the Chamber of Swine Producers of Entre Ríos (CAPPER), the Swine Farming Technology Exchange Group (GITEP), the Porcino Magro marketing group (PORMAG) and the Sociedad Rural Argentina (SRA), launched the Consumer Promotion Program for Fresh pig meat, with the "voluntary" contribution of \$ 1.- per hog sold which will generate a fund, which is expected to increase with a similar contribution from the National Government

The Argentinian pork trade balance was heavily deficit in 2018. Exports of pork and pork products approached U\$S 38 million, while imports exceeded U\$S 123 million⁴. Argentina ranked number 33 in the world ranking of pork exporters in 2018, with a very low participation of 0,1% of global trade. Neighbouring countries' Brazil and Chile accounted for about 3,8% and 1,5% respectively. About 87% of Argentina imports' s pork come from Brazil. A large part of these shipments is frozen boneless pork.

To be prepared for the growing (inter)national demand for Argentine pork the country will have to invest in sustainable primary production, the main pig producing companies are already familiar with European production standards, while new players in the market are seeking for the incorporation of state-of-the-art technology, including first class genetics, management systems, farm technology and are interested in auto-generation of energy, such as for instance of biogas.

The processing industry Argentina is looking to expand its slaughtercapacity, wants to invest in deboning facilities to better attend the specific requirements in the world market, add cold store capacity and takes into consideration environmental-friendly solutions for waste stream management.

The Dutch and Argentine pig sector can work together and interchange information, knowledge, know-how and technology within almost every aspect of the pig production chain. Interviews with various stakeholders within the sector mentioned the following subjects as main priority:

- ✓ Genetics, but the main international players are present within the market
- ✓ Facilities (feeding systems)
- ✓ Design
- ✓ Farm Management equipment
- ✓ Management software
- ✓ Nutrition specialized in piglets
- ✓ Specific raw materials
- ✓ Financing for growth projects
- ✓ Joint development in new markets
- ✓ Sustainability and animal welfare projects
- ✓ Slaughterhouse technology (deboning, packing equipment)
- ✓ Cold store capacity

³ Actualidad y perspectivas en la cadena de la carne de cerdo – J. M. Garzón y V. Rossetti – Ieral (2019)

⁴ INDEC (2019)

1 BACKGROUND

Over the past two years the Dutch Agricultural Attaché for Argentina, Chile, Paraguay and Uruguay, Mrs. Leontine Crisson, has noted a cautious but growing interest from Dutch companies in the Argentinean pig chain and vice versa.

A private mission to Argentina was organized in 2017 by Agrivalue SA with participation of 15 Dutch pig farmers and suppliers of technology in the field of stable design, farm management systems, feeding systems, biogas, pig slaughter and processing. In November 2018, two large-scale Argentinian pig farmers (representatives of the export association Argenpork) made a successful visit to the Netherlands accompanied by Agrivalue to gain insight into Dutch knowledge and technology in the field of further processing.

The reason for this mutual interest lies in the desire and possibility of Argentina to export to high demand markets such as China, now that more and more markets have opened.

Local consumption has also increased. Although economic conditions are sometimes still volatile, animal production has increased, and there is growing interest in market diversification.

Argentina has the most important conditions for the further development of the pig chain, such as availability of grains (read: animal feed), space and interest in technological application and innovation.

This gives many opportunities for Dutch actors in this chain to provide services in the field of knowledge and technology. There is a need for genetics, animal feed, stable development, management systems, agro-logistics, slaughtering and processing technology, but there is also growing attention for circular agriculture, environmental aspects and animal welfare.

The Dutch slaughterhouses and meat-processing companies are forerunners in the field of further sustainability of their own company and of the production chain as a whole. The available Dutch knowledge about reducing environmental pressure (soil, fossil raw materials and the use of water and energy) is of great importance for Argentinian players in the market if the country is to play a role in the international market in the future.

The latest market report on the pig sector in Argentina dates from 2011 and contains outdated information. In view of this new situation, the Dutch Agricultural Counsellor concluded it is time for an update with an orientation towards the opportunities of Dutch-Argentine cooperation in this area.

This sector study provides a thorough description of the state of affairs in the Argentine pig sector, including the challenges and goals they want to achieve. It also contains a good description of the promising sub-sectors for Dutch companies.

2 ARGENTINA COUNTRY PROFILE

2.1 General information

Argentina is an independent state and a republic in South America that stretches 4.300 km from its sub-tropical north to the sub-Antarctic south.

Argentina is constituted as a federation of 23 provinces and the autonomous city Buenos Aires. Argentina has a population of 42 million people; the capital and largest city is Buenos Aires.

With an area of 2.780.400 km² it is the 8th largest country in the world and the second largest country in South America by land area. It has the third biggest economy in South America, after Brazil and Mexico.

There are seven geographical regions in Argentina: Argentine Northwest; the Chaco Region (Gran Chaco), a hot and semi-arid lowland; the mountain chain of the Sierras Pampeanas; subtropical Mesopotamia (Littoral); Cuyo in central-west; the Pampas, a vast fertile alluvial plain; and Patagonia, the sparsely populated south of Argentina.

Image 1 Map of the Republic of Argentina



The country offers several climatic zones ranging from (north to south) tropical and subtropical zones along the Brazilian border to temperate regions to a subpolar area in the extreme south.

Argentina benefits from rich natural resources, a highly literate population, an export-oriented agricultural sector, and a diversified industrial base. It is a leading food producer with large-scale agricultural and livestock industries. It is among the world's largest beef and soybean exporters and is the leading producer of sunflower seeds, yerba mate, lemons and soybean oil. The opening of the Chinese market has helped boost the country's export potential.

2.2 Political Situation

A reform-minded president is currently in power, but obstacles remain⁵. President Mauricio Macri has addressed the important economic issues left by the former government (e.g. debt default and highly interventionist policies) by cutting energy subsidies, abolishing export taxes, lifting capital and currency controls and floating the (overvalued) Argentinian peso. In early 2016 Argentina negotiated a debt deal with the remaining holdout creditors, which enabled the country to exit default and return to international capital markets. This has comprehensively improved the economic relationships with the IMF, the US and Europe. While the governing coalition gained additional seats in the October 2017 mid-term legislative elections it still lacks a majority in both the Chamber of

⁵ Atradius Country Report Argentina 2018

Deputies and the Senate. This means that President Macri must cooperate with the opposition in order to obtain parliamentary majorities for reforms.

The pro-business Macri has the support of financial markets and Washington but has lost popularity amid discontent over austerity measures and low growth. He says he is taking the necessary, painful steps to get the economy going after 12 years of leftist populism under Cristina Fernández and her predecessor and late husband, Nestor Kirchner.

A ticket involving former President Cristina Fernández emerged as the strongest vote-getter in Argentina's primary elections in August 2019, indicating conservative President Mauricio Macri will face an uphill battle going into general elections in October.

Primaries in Argentina are held simultaneously, and obligatory voting made this contest effectively a litmus test for the Oct. 27 presidential election since the main parties have already chosen their nominees. To be elected president in Argentina in the first round, candidates need to finish first with at least 45% of the votes or have 40% and a greater than 10-point advantage over the nearest rival. If no candidate wins outright in October, there will be a November runoff.

Official results gave the presidential slate headed by Alberto Fernández and his vice-presidential running mate, Cristina Fernández, about 47% of the votes. Macri and his running mate, Miguel Ángel Pichetto, had nearly 33%. There were six other presidential slates in this election, with 33.8 million people entitled to vote.

2.3 Argentine Economy

While President Macri's return to more market friendly policies has improved Argentina's medium- and long-term growth prospects, significant downside risks remain.

Although one of the world's wealthiest countries 100 years ago, Argentina suffered during most of the 20th century from recurring economic crises, persistent fiscal and current account deficits, high inflation, mounting external debt, and capital flight, culminating in 2001 in the most serious economic, social, and political crisis in the country's turbulent history.

In 2014, the government took some measures to mend ties with the international financial community, including engaging with the IMF to improve its economic data reporting, reaching a compensation agreement with Repsol for the expropriation of YPF, and agreeing to pay \$9.7 billion in arrears to the Paris Club over five years, including \$606 million owed to the US.

In July 2014, Argentina made its first payment to Paris Club creditors. At the same time, the Government in July 2014 entered a technical default on its external debt after it failed to reach an agreement with holdout creditors in the US. The Fernandez de Kirchner government rejected repeated attempts by the court to encourage a negotiated solution with holdouts.

Throughout much of 2015, negotiations to repay holdout creditors stalled. The government's delay in reaching a settlement and the continuation of interventionist policies contributed to high inflation and a prolonged recession.

After being elected into office on December 10, 2015, President Macri has taken significant steps to liberalize the Argentine economy. His administration lifted capital controls; floated the peso, negotiated debt payments with holdout bond creditors, and removed export controls on some commodities. Macri has promised to strengthen institutions, introduce more pro-business policies

and cut deals with foreign creditors. With a Gross Domestic Product (GDP) of more than US\$ 540 billion, Argentina is one of the largest economies in Latin America.

In 2018 the Argentine economy⁶ is expected to have remained in recession in the third quarter, battered by the turmoil in financial markets and a sharp depreciation of the peso. In the fourth quarter, economic weakness likely persisted although macroeconomic rebalancing continued:

Consumer confidence was deep in negative territory in October–November 2018, while the trade balance recorded the second consecutive surplus in October. The delicate economic situation, coupled with rising debt levels, prompted Fitch Ratings to change the country’s outlook from stable to negative, and S&P to lower its rating from B+ to B in the first half of November. Against this backdrop, the Senate approved an austerity budget in mid-November, paving the way for the approval of the second IMF review of the country a few days later which will allow the disbursement of US\$ 7,6 billion by the end of the year. Moreover, the primary deficit narrowed considerably in January–October, although the overall fiscal deficit widened in the same period due to surging interest payments.

Economists had long argued that Argentina’s peso currency was overvalued, and the government acknowledged that it would depreciate gradually over the years. But no one expected the speed with which the peso plunged against the dollar in April 2018, due to investor concerns about the government’s ability to control inflation and interest rate hikes by the U.S. Federal Reserve, which strengthened the dollar worldwide. The depreciation made Argentina’s dollar debts more expensive for the government, prompting it to turn to the International Monetary Fund (IMF) for a \$50 billion loan.

The economy will likely remain stuck in recession next year, although the contraction should soften. Strong, albeit moderating, inflationary pressures and rising taxes will eat into consumers’ pockets, while high interest rates and shrinking public investment will weigh on fixed investment.

That said, the trade balance is set to swing from deficit to surplus, thanks to higher agricultural exports and lower imports, while the fiscal deficit ought to narrow. Downside risks stem from possible capital flight following the Fed’s tightening cycle and the uncertain political outcome in next year’s elections. Analysts⁷ see the economy contracting 0,9% in 2019, down to 0,4 percentage points from last month’s estimate, before rebounding to 2,7% growth in 2020.

Table 2 Argentina Economical Data ⁸

	2013	2014	2015	2016	2017	2018 ⁹
GDP per capita (USD)	14.540	13.133	15.110	12.507	14.609	12.061
GDP (USD billion)	614	560	652	554	644	519
Economic Growth (GDP, annual variation in %)	2.4	-2.5	2.7	-1.8	2.9	-2.5
Domestic Demand (annual variation in %)	4.0	-3.9	4.2	-1.3	6.3	n.a.
Consumption (annual variation in %)	3.6	-4.4	3.7	-1.0	3.6	n.a.
Investment (annual variation in %)	2.3	-6.8	3.5	-4.9	11.3	n.a.
Industrial Production (annual variation in %)	0.0	-1.8	0.4	-4.6	1.8	-5
Retail Sales (annual variation in %)	26.7	37.3	27.3	26.2	20.8	n.a.
Unemployment Rate	7.1	7.3	7.1	8.4	8.4	9.5

⁶ Focus Economics (2018)

⁷ LatinFocus Consensus Forecast analyst

⁸ Focus-Economics 2018

⁹ Ceicdata.com (2019)

Fiscal Balance (% of GDP)	-1.9	-2.4	-3.9	-5.9	-6.0	-5.2
Public Debt (% of GDP)	43.5	44.7	52.6	53.3	57.1	86.2
Money (annual variation in %)	25.7	28.9	28.2	30.4	26.0	47.6
Inflation Rate (CPI, annual variation in %, eop)	26.6	38.0	26.9	41.0	26.1	n.a.
Benchmark Interest Rate (%)	21.63	20.38	27.25	19.88	23.25	n.a.
Stock Market (annual variation in %)	88.9	59.1	36.1	44.9	77.7	72.1
Exchange Rate (vs USD)	6.52	8.46	12.94	15.86	18.60	27.36
Current Account (% of GDP)	-2.1	-1.6	-2.6	-2.7	-4.8	-5.4
Current Account Balance (USD bn)	-13.0	-8.9	-16.8	-15.0	-30.8	-27.7
Trade Balance (USD billion)	1.5	3.2	-3.0	2.1	-8.5	-3.8
Exports (USD billion)	76.0	68.4	56.8	57.7	58.4	61.6
Imports (USD billion)	74.4	65.2	59.8	55.6	66.9	65.4
Exports (annual variation in %)	-5.0	-9.9	-17.0	1.7	1.2	54

(Source: Agrivalue based on Focus-economics, Knoema, Indec, Ceicdata data amongst others)

Main trading partners of Argentina are Brazil, China and the United States, others include Chile, Germany, Mexico and India.

Table 3 Argentina Trade partners

Main Import sources 2016 (%-age of total)		Main export markets (2016, % of total)	
Brazil	24.5%	Brazil	15.6%
China	18.8%	United States	7.8%
United States	12.6%	China	7.7%
Germany	5.5%	Chile	4.0%
Mexico	3.2%	India	3.8%

(Agrivalue SA based on Atradius 2018)

Argentina has recorded trade surpluses from 2001 to 2014, mostly due to exports of agricultural products. In 2015 and 2017, the balance returned to deficit due to slowdown in exports growth and higher imports.

Main exports are cereals, fats and oils, beef and related products and dairy products (36% of total exports), motor vehicles and parts (12%); chemicals and related products (7%) and crude oil and fuels (5%).

Main imports are intermediate goods (29% of total imports), parts and accessories for capital goods (20%), capital goods (19%), fuels and lubricants (13%) and motor vehicles (8%).

Table 4 Argentine Trade Balance¹⁰

Year	2013	2014	2015	2016	2017	2018
Trade Balance (USD billion)	1.5	3.2	-3.0	2.1	-8.5	-3.8

(source: Agrivalue SA based on INDEC)

Exports leaped 14,5% in year-on-year terms in November 2018, following October's 1,4% increase. November's rise reflected a strong increase in exports of fuels and energy and of primary products, as well as healthy expansions in foreign sales of manufactured products of agricultural origin and of exports of manufactured products of industrial origin.

¹⁰ <https://www.indec.gov.ar/indec/web/Institucional-Indec-LastestIndicators>

In terms of export markets, solid export growth towards Mercosur (especially Brazil) and Chile and a notable surge in exports towards China were only partially dampened by declining exports towards ASEAN and South Korea.

Imports plummeted 29,2% annually in November, a sharper fall than October’s 18,2% contraction. A plunge in imports of capital and consumption goods, as well of imports of passenger motor vehicles, just partially compensated by sturdier imports of intermediate goods, explain November’s contraction.

Meanwhile, the trade balance surplus widened from a USD 278 million surplus in October to a USD 979 million surplus in November, the third consecutive surplus after 20 months in the red and the best reading since June 2014 (November 2017: USD 1.5 billion deficit). The 12-month rolling trade deficit came in at USD 6 billion (November 2017: USD 7.5 billion shortfall), narrowing from October’s USD 8.5 billion deficit and marking the best result in over one year.

Panellists participating in the LatinFocus Consensus Forecast expect exports to expand 12% in 2019 and imports to decrease 4,8%, pushing the trade balance to a USD 5.3 billion surplus. For 2020, the panel expects exports to increase 7% and imports to grow 7,8%, with a trade surplus of USD 5,2 billion.

The credit risk situation (CRS) and business performance (BP) in various Argentine productive sectors are presented in the table below. As table 5 shows the Food sector, Financial services sector and most of all the Agricultural sector were the best performing industries in the country. In 2018 the credit risk situation of Food industry is benign and business performance in the sector is above its long-term trend.

Table 5 Argentina industries performance outlook (2018)

Excellent	Good	Fair	Poor	Bleak
				
The CRS is strong / BP is strong compared to its long-term trend	CRS is benign / BP is above its long-term trend	The CRS is average / BP is stable	The CRS is relatively high / BP is below long-term trend	The CRS is poor / BP is weak compared to its long-term trend

Agriculture	Automotive / transport	Chemicals/ Pharma	Construction	Consumer Durables
				
Electronics / ICT	Financial Services	Food	Machines / Engineering	Mining
				
Metals	Paper	Services	Steel	Textiles
				

(Source: Agrivalue SA based on Atradius)

2.4 Argentine Agriculture

Agriculture in Argentina is one of the main economic activities that not only caters to the country, but of which the surplus is exported.

Argentina has a continental area of about 2.8 million km² and has around 34 million hectares of agricultural crops. The main crops are soy, wheat, corn, sunflower, sorghum and rice. Production of vegetables and legumes occupies only 1,5% of that total, with 500.000 hectares.

According to the prevailing climate, the country is divided into mild, sub-tropical and arid regions. The different soils and climates in the country, offer a variety of agricultural products, adapted to the possibilities of each region.

In the mild climate area (which basically comprises the Pampa plain) commodities such as cereals and oilseeds are grown.

- Cereals production: Argentina is one the first 10 wheat producers in the world. It is grown in the province of Buenos Aires and the croplands alternate with sunflower, potatoes and pasturing. In Córdoba, Santa Fe and Entre Ríos, wheat alternates with corn, soy and pasturing. Furthermore, you can find rice and pasturing crops such as alfalfa, oats, barley and rye.
- Oilseeds growing: The so-called “oil complex” is the main exporting block and one of the pillars of the national economy. The main oilseed crop is soy, followed in importance by sunflower. Also produced, although in very small proportions, safflower, canola and flax.
- The main producing provinces are Cordoba, Santa Fe and Buenos Aires, which together represent 84% of the national total. Argentina is the world’s largest supplier of oil and soybean meal and the third largest supplier of corn.
- Horticulture growing in the provinces of Buenos Aires and Cordoba potato production predominates
- Fruit growing (citrus fruits, peaches and plums) are favourite in Rosario and San Pedro areas. Tangerines, oranges and lemons stand out in Entre Ríos.
- Floriculture: 90% of the floricultural surface is in the Pampa plain. Due to the high capital investment, the quantity of labour involved and the demand of production factors, the rate of this activity is intensive. It is also characterized by the small surface of the output units and by its high profitability.

Image 2 Argentine Production regions



(Source: <http://www.alimentosargentinos.gob.ar>)

Agriculture in Sub-tropical: in the Misiones plateau and in Corrientes are crops of yerba mate, tung-oil-tree, and tea. Tung-oil-tree comes from Asia and adapted very well to this region, being used for wood polishing. Over 80% of the domestic cotton produce can be found in the Chaco plain. Fruits and vegetables are grown in Santiago del Estero. In Valle de Lerma there are cereals, tobacco, sugarcane, soy and cotton plantations. The Valles Calchaquies stand out for their vineyards which produce exquisite wines, besides citrus and tropical fruits. Lemon output in Tucumán is regarded as one of the most important ones in the country.

Agriculture in Arid Climate Area: this region presents climatic difficulties to cultivate the soil. Nevertheless, grapevines turn La Rioja into the third domestic producer. In Cuyo, the vineyards account for most of the crop area.

Besides agricultural crop areas Argentina has one of the biggest cattle herds in Latin America, with over 54 million head of cattle in 2019, resulting in more than 3 million Mt carcass weight equivalent. Argentine beef production for 2019 is forecast at 3.0 million metric tons carcass weight equivalent, the largest volume since 2009 when climatic and economic conditions culminated in high slaughter numbers. Grass-fed cattle operations are seeing positive returns and new export opportunities should continue to spur investment in herd expansion. Rising commodity input costs, however due to recent currency depreciation, are negatively impacting margins of feedlots operations.

Although the industry has been rebuilding the herd from a low of 48 million head in 2011, the herd expansion rate has stalled due to the 2017/18 drought, a low-weaning calf ratio and high slaughter of cows for export. Despite some advances in cow-calf productivity, maternal nutrition and pro-active healthcare remain problematic to support herd growth.

Argentinian livestock is distributed over 320.000 production units linked to 205.000 farms. Cattle production is concentrated in five main farming regions: North West (NOA), Cuyo, Patagonia North East (NEA) and Pampeña–Central. There are 45 million head of cattle located in the North-East and Pampeña–Central.

There are three main types of cattle farms in Argentina:

- 1) small family livestock rangeland cattle ranches
- 2) medium-sized commercial ranches which manage more intensive breeding, pasture and/or fattening methods
- 3) large commercial ranches which manage more intensive breeding, pasture and/or fattening methods.

Most cattle production is concentrated under the management of a few large farms. Argentina has approximately 450 slaughter plants in operation with over 95% monitored by government authorities. Plans are underway to provide consistent sanitary standards at the national, provincial and county levels.

In 2019, Argentina is expected to slaughter 13.2 million head, the highest number in over a decade. Average carcass weight is projected to increase somewhat in response to export demand for heavier animals and a government policy change to restrict slaughter of lighter-weight cattle. From 2005-2015, governmental policies limited exports and fostered domestic consumption at low prices which resulted in producers finishing lightweight animals of around 300-380 kilos live weight. Heavier animals, preferred in export markets, had finite demand, cost more to produce and were unprofitable during that time.

3 GLOBAL MEAT SECTOR

3.1 Global Feed production

As world population grows, so does the middle class, which is well reflected in an increase in overall protein consumption. In 2018 world feed production increased by 3% to 1.103 billion metric tons. The feed industry has seen 14,6% growth over the past five years (avg. 2,76 % per year).

The eight main feed producing countries are China, the United States, Brazil, Russia, India, Mexico, Spain and Turkey. Together, they ensure 55% of the world's balanced feed production and contain 59% of the world's factories. These countries can be considered as an indicator of trends in agriculture. The predominant growth arose in the food sectors for layers, broilers and dairy cattle.

Image 3 Global Feed Production (million Metric tons)



(Source: Alltech Global Survey 2019)

World pig feed production saw an increase of about 1% in 2018. The primary producing region for pig feed is Asia-Pacific but this was also the only region that saw a decline in pig feed production.

Mongolia, Vietnam, China, New Zealand and Japan all saw decreases in pig feed production.

Europe saw the biggest growth in pig feed production, at about 2.2 million metric tons. Russia and Spain could nearly account for all of this, but others, including Finland, Denmark, France and Poland, also contributed. Latin America¹¹ saw the greatest growth in pig feed as a percentage at 5%, with the largest growth seen in Mexico and Argentina.

Table 6 World pig feed production (Million Metric Tons)

Continent	Feed Production (2018) Million Metric Tons
Africa	2.2
Asia-Pacific	126.8
Europe	80.0
Latin America	31.5
Middle East	0.0
North America	52.7
Total	293.2

¹¹ Alltech Global Survey (2019)

3.2 Global Meat Production

Meat production is currently almost five times higher than in the early 1960s, as it went from 70 million tons to more than 336 million by 2018, according to the Food and Agriculture Organization of the United Nations (FAO). The world production of beef and veal is 71.2 million tons, while that of poultry exceeds 124 million tons and that of pork is greater than 120 million tons.¹²

World meat output is forecast to decline due to a fall in pig meat output, primarily in China, more than offsetting expansions in bovine, poultry and ovine meat categories as table 7 shows.¹³

Table 7 World meat market statistics (million metric tons)¹⁴

World balance	2017	2018 (estimate)	2019 (forecast)	Δ-age 2019 -2018
Production	Million metric tons			%
<i>Total Production</i>	332.4	337.3	336.5	-0.2
Bovine meat	69.6	71.2	71.6	0.7*
Poultry meat	122.3	124.8	128.4	2.8
Pig meat	119.8	120.5	115.6	-4.0
Ovine meat	15.2	15.2	15.3	0.4
Trade	Million metric tons			
<i>Total Trade</i>	32.8	33.8	35.4	4.8
Bovine meat	10.2	10.9	11.3	4.0
Poultry meat	13.1	13.3	13.8	3.7
Pig meat	8.2	8.4	9.1	8.4
Ovine meat	1.0	1.0	1.0	-1.9

(Source: FAO 2019)

Regionally, Asia is the largest meat producer, accounting for around 40 to 45% of total meat production. This regional distribution has changed significantly in recent decades. In 1961, Europe and North America were the dominant meat producers, accounting for 42 and 25%, respectively. In 1961, Asia produced only 12%. By 2013, Europe and North America's share had fallen to 19 and 15%, respectively.

This reduction in production share was despite a large increase in production in absolute terms: Europe's meat output has approximately doubled over this period, whilst North American output has increase 2.5-fold. Production increases in Asia, however, have been staggering as meat production has increased 15-fold since 1961.

Absolute increases in production in other regions have also been substantial, with output in all regions (with exception to the Caribbean which approximately tripled) growing more than 5-fold over this period.

Table 8 shows global meat production by the main production regions during the last two years, measured in thousand metric tons.

¹²⁺¹⁵ <http://www.fao.org/3/ca3880en/ca3880en.pdf>

¹³ <http://www.fao.org/3/ca4526en/ca4526en.pdf>

¹⁴ <http://www.fao.org/3/ca4526en/ca4526en.pdf>

Table 8 Total world meat production 2017-2018 (thousands Mt, Carcass weight equivalent)

Country-Region	2017	2018	Change over 2018-2017 (%)
World	332.464	336.369	1.2
China	86.887	86.598	-0.3
European Union (28)	48.136	49.084	1.9
United States	45.772	46.768	2.2
Brazil	27.586	27.579	0.0
Russian Federation	9.900	10.248	3.5
India	7.256	7.424	2.3
Mexico	6.822	7.028	3.0
Argentina	5.756	5.953	3.4

(Source: FAO 2018)

The following graph shows the countries with the greatest share of additional meat production by meat type in 2027 as expected by FAO (before the outbreak of African Swine Fever).

Graph 1 Countries with the greatest share of additional meat production by meat type (Million Metric ton carcass weight equivalent) 2027 versus 2015



(Source: OECD/FAO 2018)

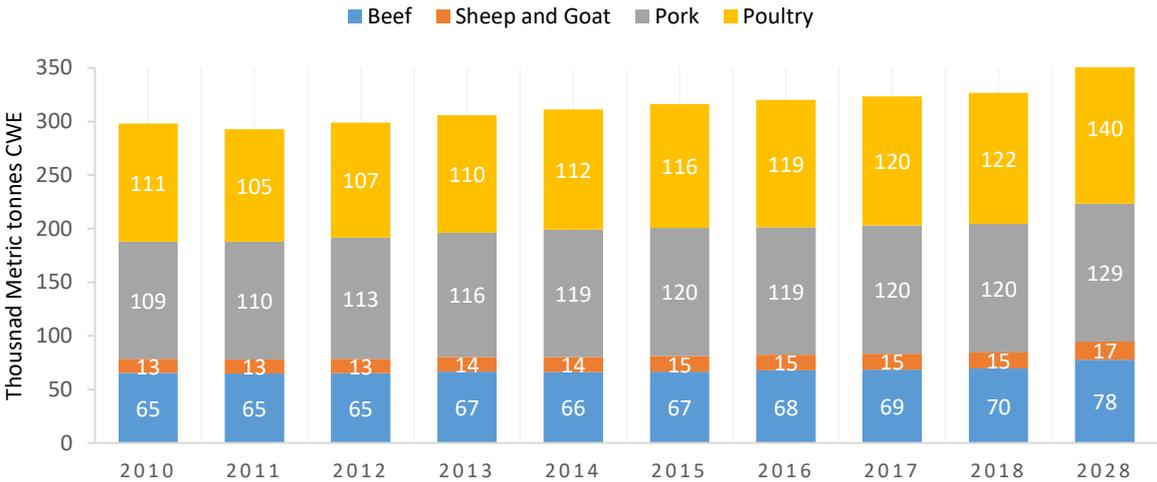
Note: c.w.e is carcass weight equivalent and r.t.c. is ready to cook equivalent

3.3 Global meat consumption

The most commonly consumed meats in the world are poultry and pork, though in the next several years poultry is expected to overtake pork in popularity.

In 2018 global meat consumption was 34,67 Kg per capita, which consist of poultry meat (14,2 Kg), followed by pig meat (12,3 Kg), beef (6,4 Kg) and sheep meat (1,8 Kg). It is expected that the global consumption of meat per capita in 2028 will be 35,07 kilograms (real weight equivalent).

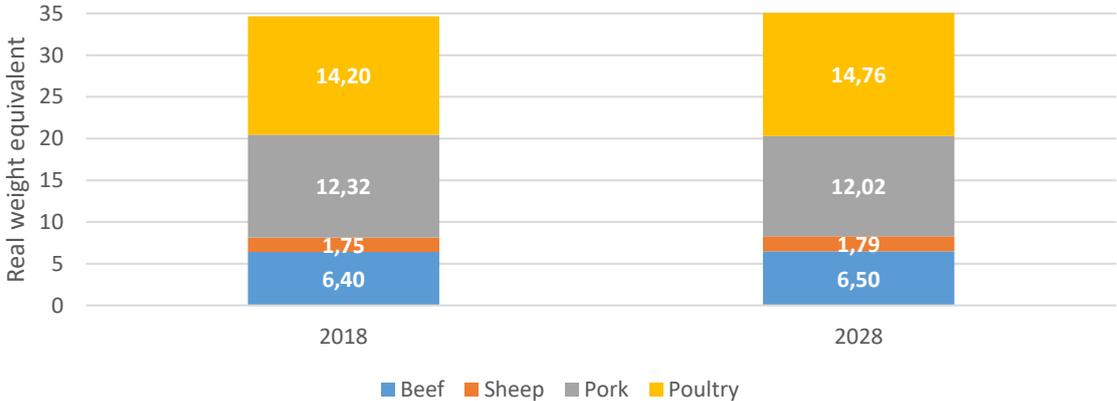
Graph 2 Annual growth of meat consumption by type (thousand MT Carcass Weight Equivalent)



(Source: Agrivalue SA based on FAO data)

The following graph shows the current per capita meat consumption and the projections for 2028:

Graph 3 Per capita global meat consumption per type

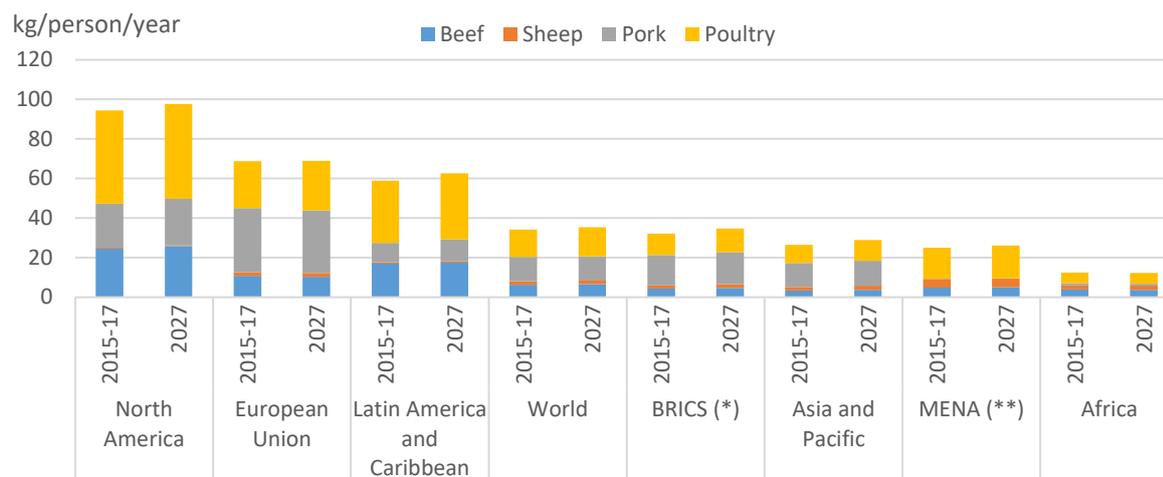


(Source: Agrivalue SA based on FAO data)

In much of the developing world, per capita meat consumption remained stable in 2017¹⁵ as income growth slowed, particularly in regions highly dependent on commodity imports. Although growth in the demand for meat is expected to recover over the period 2017-2027, particularly in the developing world, growth rates are generally expected to be lower than in the past decade.

¹⁵ FAO (2018)

Graph 4 Per capita meat consumption per region (retail weight in kg)¹⁶



(* Brasil, Russia, India, China, South Africa **Middle East, Northern Africa)

(Source: Agrivalve based on OECD/FAO (2018))

Growth will stem from a combination of income and population growth, especially in countries with large middle classes. Africa's rate of growth in consumption will be the highest of all continents however, dominated by population growth resulting in a decline in per capita consumption.

In developed countries, consumption levels are already high, but meat demand generally continues to increase, particularly in the United States where per capita consumption and meat prices will return to the same levels as a decade ago. Nevertheless, growth rates are generally lower than those in the developing countries.

In the least developed countries (LDC's) with high population growth rates, meat consumption has been growing rapidly, albeit from a low base. This is notably the case in Africa, where poultry accounts for the bulk of additional consumption in the region, followed by beef. Whereas the bulk of the sheep consumption is produced within the African region, a substantial share of additional beef, pork and poultry consumption will be imported.

Beef consumption will increase gradually over the next ten years. By 2027, it is expected to be 8% higher than in the base period in developed countries, whereas in developing regions it is expected to increase be 21% higher. In per capita terms, beef consumption in the developing world remains low relative to developed countries, at about one-third in volume terms. Population increases in Asia are the major driver of growth, together with the positive perception of Chinese buyers' that bovine meat is healthier and disease-free. Increased beef and buffalo consumption levels are also expected in Kazakhstan, Turkey, and Vietnam. The result is an expected 24% increase in beef consumed in Asia over the next decade.

Global **pig meat consumption** on a per capita basis remains stable over the outlook period (2017-2027) with consumption in most developed countries reaching saturation levels. Within developing countries, significant regional differences are evident in per capita pig meat consumption. Growth is sustained in most of Latin America, where it has grown rapidly over the past few years. Growth is fuelled by favourable relative prices that have positioned pork as one of the favoured meats, along with poultry. Several Asian countries with favourable economic conditions which traditionally consume pork such as China, Philippines, Thailand, and Vietnam (projected to become the highest

¹⁶ OECD/FAO 2018 Agricultural Outlook and Agricultural Statistics <http://dx.doi.org/10.1787/agr-outl-data-en> and <http://dx.doi.org/10.1787/888933743404>

consumer of pork per capita) are increasing consumption on a per capita basis at the regional level. Population expansion still supports growth in total pork consumption in these regions.

Poultry meat consumption increases regardless of region or income level. Per capita consumption will grow, even in the developed world, but growth rates will remain higher in developing regions. In China, consumption suffered from the AI virus outbreaks which affected humans in the last years. The Outlook assumes that consumption will not be much affected in 2018 and will return to the historical trend afterwards. Among all the additional meat consumed over the next decade, poultry is expected to account for 44%.

Sheep meat consumption worldwide on a per capita basis will reach 1.8 kg retail weight equivalent by 2027. Sheep meat consumption per capita in Africa, the Americas and Oceania is expected to decline slightly. In contrast, sheep meat will continue to expand in several Asian countries, such as China, where consumers associate sheep meat with quality and nutritional benefits. An increase in per capita consumption of sheep meat is projected for the MENA region, where it is traditionally consumed. Demand growth in this region is tightly linked to the oil market which heavily influences both the disposable income of the middle class and government spending patterns.

3.4 Global Meat Trade

Globally, animal disease outbreaks (e.g. swine fever), sanitary restrictions, and trade policies remain the main factors driving the evolution and dynamics in world meat markets.

Global meat trade boomed to US\$ 113 billion in 2017 from US\$ 40.2 billion in 2000. World meat trade is forecast to expand by more than 8% in the case of pig meat (to 9.1 million tons) caused by an expected sharp rise in imports by China, and by close to 4% in the case of poultry (to 13.8 million tons) and 4% for bovine meat (to 11.3 million tons). On the other hand, trade in ovine meat may decline slightly (to 1 million tonnes).¹⁷

The EU will remain the top exporter with shipments up 11% compared to 2017. Brazil, Canada, and the United States are also forecast higher in 2019. China remains the biggest source of demand, with imports forecast 41% higher due to an ASF-induced decline in production.

Table 9 Main meat exporters and importers in US\$ sales (2017)¹⁸

Meat exporters		Meat Importers	
Country	US\$ billion	Country	US\$ sales
United States	16.4	Japan	10.1
Brazil	14	China	9.5
Netherlands	9.9	United States	8
Australia	9	Germany	7.6
Germany	9	Hong Kong	6.6
Spain	6.6	United Kingdom	5.5
Poland	5.3	Italy	5.1
Canada	5	France	5
New Zealand	4.7	Netherlands	4.9
India	4.3	South Korea	4.4

(Agrivalue SA based on www.ihsmarkit.com)

¹⁷ <http://www.fao.org/3/ca4526en/ca4526en.pdf>

¹⁸ <https://ihsmarkit.com/research-analysis/is-global-meat-trade-overdone.html>

4 GLOBAL PIG SECTOR

4.1 Global Pig production

As of March 2018, China was home to the largest number of pigs of any country with 441 million heads. That year, the European Union and United States were second and third in the list, with over 150 and 73 million heads respectively.

There were about 781 million pigs worldwide in 2018, meaning that China was home to more than half of the global pig population. Due to the African Swine Fever China's population of pigs will shrink by 134 million herds, or 20%, in 2019, according to the US Department of Agriculture.

Table 10 Pig Stocks - Selected Countries Summary (in 1.000 head)

Total stocks	2015	2016	2017	2018	2019 (Apr)	2019 (Oct)
China	471.602	458.029	442.092	441.589	428.070	440.000
EU	148.341	148.716	147.188	150.257	148.766	148.900
United States	67.626	69.019	71.345	73.145	74.550	75.750
Brazil	39.395	39.422	39.215	38.829	38.427	38.235
Russia	19.405	21.345	21.779	22.943	23.606	23.850
Canada	13.180	13.630	13.935	14.165	14.030	14.200
South Korea	10.090	1.187	11.487	11.723	11.333	11.800
Mexico	9.788	10.043	10.229	10.410	10.700	10.540
Japan	9.440	9.313	9.346	9.280	9.160	9.260
Ukraine	7.492	7.240	6.816	6.236	6.115	5.930
Belarus	2.925	3.205	3.145	3.156	2.841	3.100
Others	2.308	2.272	n.a.	n.a.	n.a.	n.a.
World Total	801.591	792.421	776.577	781.83	767.598	781.565
Production	2015	2016	2017	2018	2019 (Apr)	2019 (Oct)
China	698.000	972.500	704.098	683.862	550.000	712.000
EU	265.287	266.000	267.250	270.000	268.500	269.000
United States	121.441	125.907	129.429	133.341	135.684	137.810
Brazil	39.830	41.477	43.700	45.250	46.500	46.950
Russia	39.050	39.635	40.230	40.954	42.500	40.400
Canada	28.983	28.812	29.026	28.128	28.600	29.000
South Korea	17.600	19.504	18.191	19.118	19.700	20.880
Mexico	17.300	17.700	18.100	18.650	19.250	18.950
Japan	16.700	16.900	16.785	16.690	16.690	16.600
Ukraine	9.624	9.296	8.767	8.100	8.550	8.650
Belarus	5.200	5.200	5.325	5.175	5.000	5.300
Others	4.921	5.028	n.a.	n.a.	n.a.	n.a.
World total	1.263.936	1.247.959	1.280.901	1.269.268	1.140.974	1.305.504

(Source: USDA Foreign Agricultural Service April 9, 2019)

China's pig herd could halve by the end of 2019 as African Swine Fever (ASF)¹⁹ takes a massive toll on the country's pig production. It is estimated that the Chinese herd is already 40% down compared to the same period in 2018, due to the huge number of pigs slaughtered in the first six months.

¹⁹ Rabobank Quarterly Global Pork Report (2019)

4.2 Global pork production

4.2.1 World production – global level

Expressed in carcass weight equivalent (cwe) the world pig production herd stock presented in the previous paragraph is more than 700 million metric tons, while net pork production reaches 113 million metric tons carcass weight in 2018 and pork trade is around 8 million metric tons cwe.

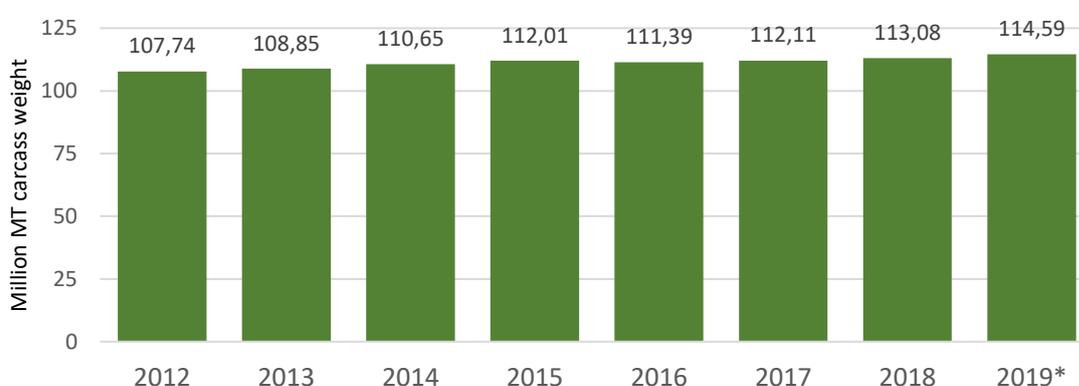
Table 11 Global pork statistics (1.000 metric tons carcass weight equivalent)

Global Indicator	2017	2018	2019*
Herd stock	616	663	732
Production	112.114	113.081	108.494
Import	7.883	7.906	8.766
Total offer	120.613	121.650	117.992
Export	8.308	8.446	9.083
Domestic consumption	111.642	112.472	108.236
dTotal demand	120.613	121.650	117.992
Final stock	663	732	673

(Source: USDA 2019)

For 2019 the estimated global pork production is 114 million metric ton carcass weight equivalent. In the following graph the production of pork worldwide is depicted from 2012 to 2019.

Graph 5 Global Pork Production 2012-2019 (million metric tons carcass weight)



(Source: Agrivalue SA based on USDA data 2019)

4.2.2 World production – country level

The largest pig producers, which represent 80% of the global supply, are China (51%), the European Union (20%), the United States (10%) and Brazil (3%).

In 2018 China's pork production (55.5 million tons) was twice as much as the EU's (23.7 million tons) and over four times as much as the United States (11.6 million tons).²⁰

²⁰ <https://www.statista.com/statistics/273232/net-pork-production-worldwide-by-country/>

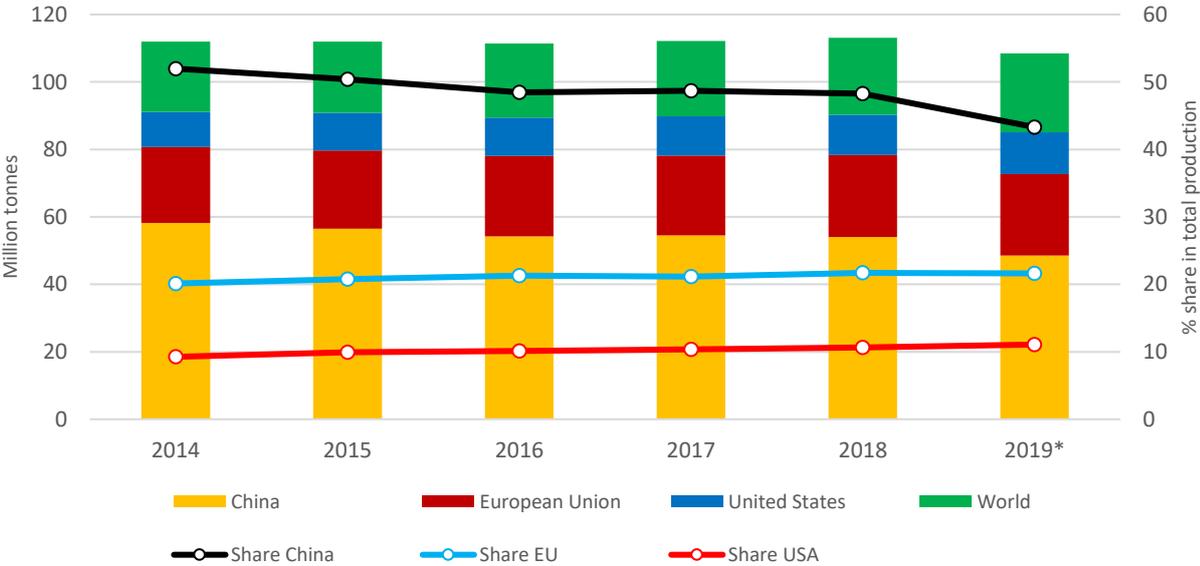
China’s production efficiency is based on the intensive production systems that it applies and on government subsidies for planting and producing soybeans. The bean is then used to transform itself into soy flour, a central food for animals. The big challenges facing the Asian giant in pigs are the presence of diseases, the shortage of drinking water and the rise in grain prices. Pork production in China is expected to fall by 25% this year, and a further 15% in 2020 due to African Swine Fever.

The European Union is at the forefront of countries producing pork. Its production has been stable for several years and is forecasted to remain stable at about 24 million metric tons. Known for its quality and taste, European pig meat finds recipients all over the world.

In 2018, the EU maintained its leadership status in pork export to non-EU countries. Although sharp increases in import demand from China have brightened the sector’s prospects, with pig meat prices showing a recent upturn, the continued spread of ASF in countries such as Romania, Hungary and Poland is dimming the EU 2019 production outlook.²¹

The United States of America is forecast to raise production by 3,8% to nearly 12 million tons this year, relying on its largest pig herd inventory since 2009.

Graph 6 Leading pork production countries (2014-2019*)



(Source: Agrivalve SA Based on USDA data)

After experiencing a challenging 2018, Brazil’s pork industry has more promising prospects in 2019. After two years of contraction, Brazil’s production is anticipated to rebound by 5,5%, spurred by robust availability of feed supplies following record maize and soybean crops and a strong foreign demand. However, there is concern that feed costs may rise if the Brazilian real depreciates further, as such development would encourage grain exports over supplying to the domestic feed industry. China is expected to drive Brazilian export growth. The recent return to the Russian market – through recertification of a limited number of plants – will also contribute to rising exports. Local demand has the potential to improve further due to the more positive economic landscape.

In the Russian Federation, pig meat output is set to expand by 3%, thanks to large-scale investments in new breeding operations, farms and processing facilities. Growing import demand may provide

²¹ https://apps.fas.usda.gov/psdonline/circulars/livestock_poultry.pdf

additional support, although depressed domestic prices and escalating costs, in part to meet tighter environmental regulations, could undermine progress.

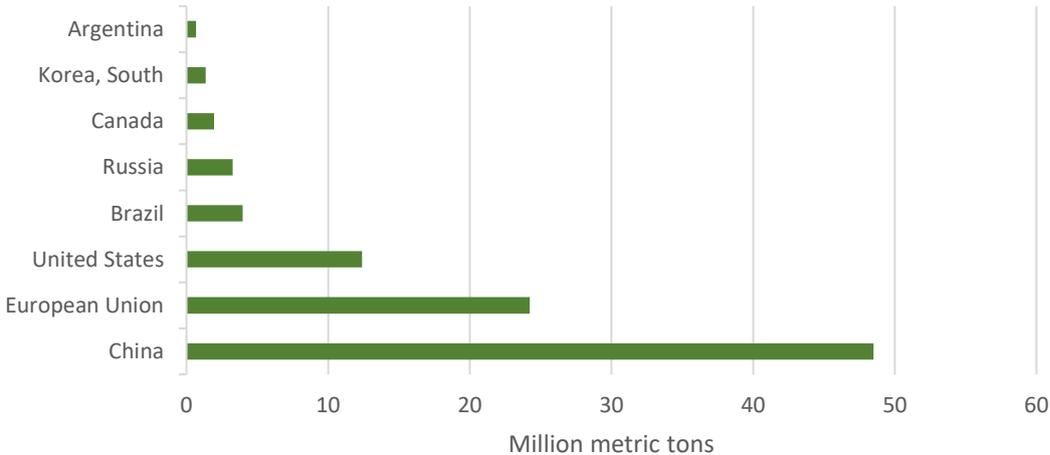
In Mexico, year-on-year growth in pig meat production may reach 4%, underpinned by larger herd numbers, attractive producer prices and the prospect of a new trade deal with its northern neighbors that may come into force.²²

African Swine Fever (ASF) outbreaks have resulted in liquidation of breeding herds and caused a sharp reduction in output in China. Reduced hog supplies will result in a substantial contraction in pork production this year. The Asian country suffers a major attack of "swine fever" (there is no cure or a vaccine to counteract it) which caused a very significant reduction in the stock of pigs.

374 million heads have been lost so far and if, as is highly probable, the number of losses in this livestock sector would grow 30% to 50% in the third semester of this year. China’s pork output could fall to just 38 million metric tons in 2019, versus 54 million metric tons last year²³.

Global pig meat production is forecast at 115.6 million metric tons in 2019, by the FAO, a decline of 4% from the prior year with a contraction in China outweighing expansions especially in the United States, Brazil and Russia. African Swine Fever (ASF) outbreaks have resulted in liquidation of breeding herds. Reduced hog supplies will result in a substantial contraction in pork production this year.

Graph 7 Outlook Leading pig production countries for 2019 (Million Mt cwe)²⁴



(Source: Agrivalve SA based on USDA data)

Other factors, including disease management and the weather, are hindering production in Europe and Brazil. The resumption of Sino-US trade negotiations seemed to be a positive development, implying a chance for China to review tariffs on US pork imports, but in August 2019 China announced among the U.S. goods targeted by Beijing’s latest duties were soybeans, which will be hit with an extra 5% tariff starting September and beef and pork from the United States with an extra 10% tariff from December 2019.

²² <http://www.fao.org/3/ca4526en/ca4526en.pdf>

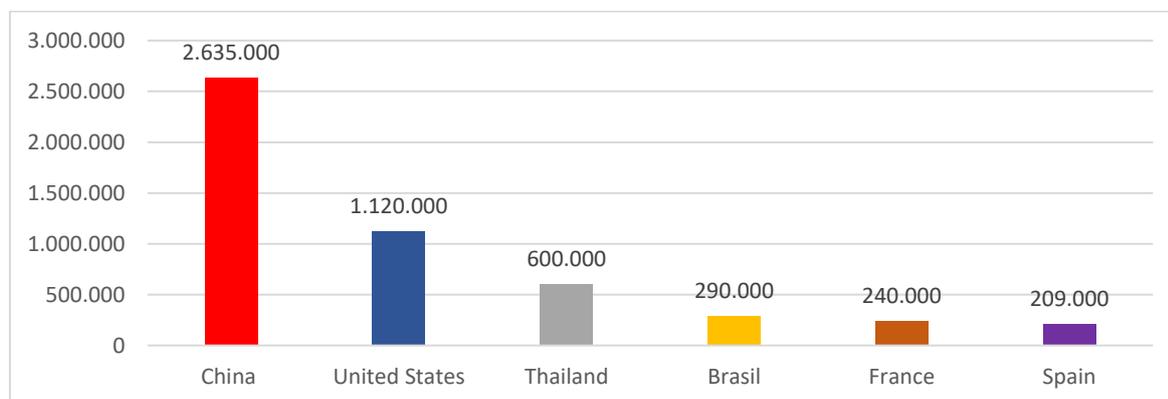
²³ Rabobank (April 2019)

²⁴ <https://www.statista.com/statistics/273232/net-pork-production-worldwide-by-country/>

4.2.3 World production – company level

The two largest sow husbandry farms are firmly in Chinese hands. While the head-office of the largest 10 sow keeping companies are located in China (3), the United States (3), Brazil (1) and Thailand, France and Spain (1 each). Together these ten companies keep more than 5 million sows.

Graph 8 Location of head-office of the 10 biggest sow keeping companies (December 2017)



(Source: Agrivalue SA based on Topagrar.com)

In 2019 WH Smithfield Group located in Hong Kong remains the world's largest pork company. WH Group expanded in 2014 by buying US Smithfield Foods for US\$4.7 billion. The company had 1.34 million sows²⁵ in December 2017 and US\$22.6 billion in sales in 2018.

The company has commanding leading positions in markets such as the US, Europe, and China. Through its integrated operations, WH Group specializes in hog production, fresh pork, and meat products.

Of the three specializations, the company's packaged meat product division is the most important as it accounted for around half of total sales and approximately 90% of operating profit for 2018. If China and the US end their tariffs for hog imports, WH Group could benefit by exporting cheap US hogs to China. That potential is one reason why WH Group's stock price recovered off its 2018 lows.

The Wens-Group from Guangdong province in the south of the People's Republic of China follows with 1 million sows in December 2017 in second place.

500.000 sows are looked after by the Chinese Muyuan Foodstuffs Co. Ltd. from Henan, a province in the eastern center of China. Globally, the company is number four.

In view of the mega stocks in China, the holdings of major US corporations now appear small, Triumph Foods from the American St. Joseph has "only" 395.000 sows.

In Europe, Cooperl from France is one of the largest sow owners, with 240.000 sows in the network. The LFD holding is the largest operation in Germany with 55.000 sows.

²⁵ Topagrar.com by Marcus Arden "In Asien sitzen die Mega-Sauenhalter der Welt (December 2017)

Graph 9 The 26 biggest sow keeping companies world-wide (2018)

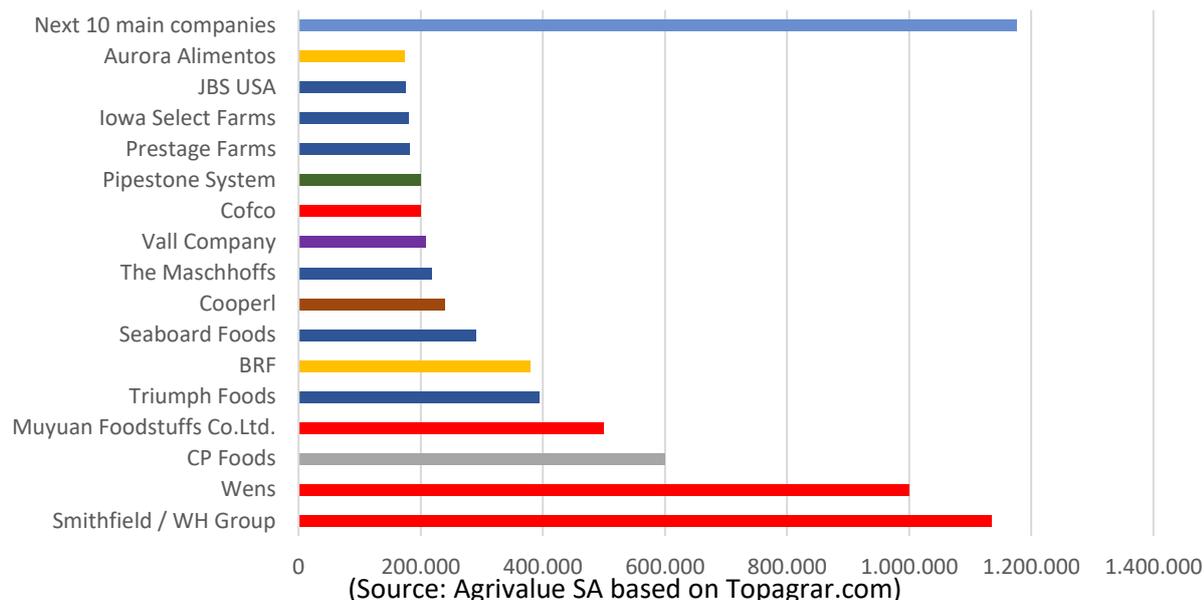


Table 12 The 26 biggest sow keeping companies world-wide (December 2017)

Nr.	Company	Headquarters	# Sows
1	Smithfield / WH Group	United States, China, Hong Kong	1.135.000
2	Wens	Guangdong, China	1.000.000
3	CP Foods	Bangkok, Thailand	600.000
4	Muyuan Foodstuffs Co.Ltd.	Nanyang, Henan, China	500.000
5	Triumph Foods	St. Joseph, MO. United States	395.000
6	BRF	São Paulo, Brasil	380.000
7	Seaboard Foods	Shawnee, Ks. United States	290.000
8	Cooperl	Lamballe, France	240.000
9	The Maschhoffs	Carlyle, Ill., United States	218.000
10	Vall Company	Lleida, Spain	209.000
11	Cofco	Beijing, China	200.000
12	Pipestone System	Pipeston, MN, United States	200.000
13	Prestage Farms	Clinton, N.C., United States	182.000
14	Iowa Select Farms	Iowa Falls, Iowa United States	180.000
15	JBS USA	Greeley, Co. United States	175.000
16	Aurora Alimentos	Chapeco, Brasil	173.000
17	Truein Agriculture Animal H. Group LLC.	Inner Mongolia	150.000
18	Miratorg	Moscow, Russia	130.000
19	Aveltis	Locmine, France	120.000
20	Carthage Veterinary Service Ltd.	Carthage, Ill., United Staes	120.000
21	Piensos Costa	Caspe, Spain	117.000
22	AMVC Management Services	Audubon, Ia., United States	112.500
23	Zhengbang	Nanchang City, China	110.000
24	Betagro	Bangkok, Thailand	110.000
25	Maxwell Foods	Goldsboro, N.C., United States	106.000
26	Keken	Merida, Mexico	100.000

(Source: Agrivalue SA based on Topagrar.com 2018)

4.3 Global pork consumption

The increasing per capita consumption of pork per is part of the global trend of consuming more red meat, due to the increase in income of consumers. The pig meat market has grown significantly during the last decades, consumption has increased by more than 80% in the last 30 years. The increase in the consumption of pigs grows both in countries with already consolidated markets, and those in development.

Table 13 Pork consumption per country (thousand metric tons carcass weight equivalent)

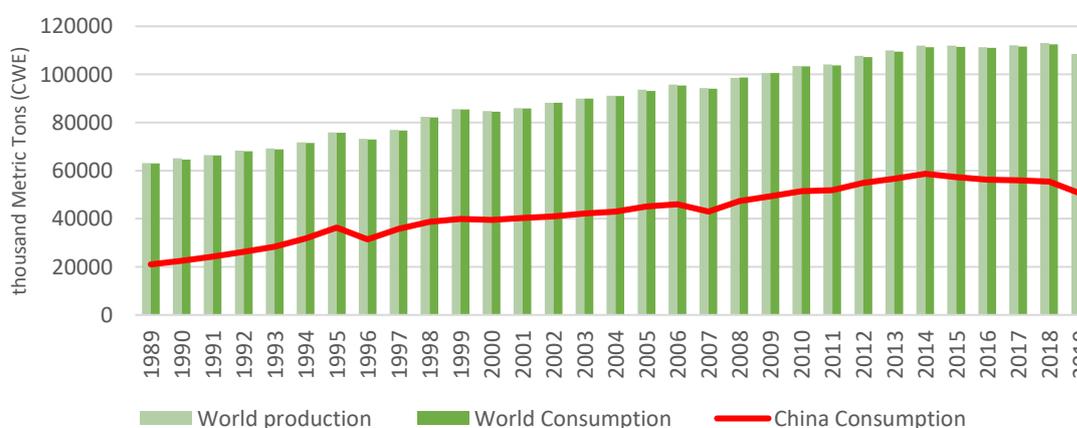
Nr.	Country	2017	2018	2019*	Share (% of total)
1	China	55.930	55.398	50.540	46.7%
2	European Union	20.816	21.380	20.990	19.4%
3	USA	9.542	9.749	10.065	9.2%
4	Russia	3.327	3.197	3.340	3.0%
5	Brazil	2.941	3.035	3.077	2.8%
6	Vietnam	2.703	2.786	2.925	2.7%
7	Japan	2.731	2.775	2.800	2.6%
8	Mexico	2.180	2.331	2.425	2.2%
9	South Korea	1.926	2.001	2.084	1.9%
10	Philippines	1.803	1.887	1.954	1.8%
13	Argentina	608	664	713	0.7%
	Total World	110.500	113.027		100%

(Source: Agrivalue SA based on USDA 2018)

China, the European Union and the United States are the world's largest consumers of pork and account for 78% of total consumption: China consumes almost 50% of the total, the European Union 19% and the United States 9%. These consumers are also the three main producers in the world.

Graph 10 shows to what extent the increase in world production was determined in the last 30 years by the increase in consumption in China. The Asian giant more than doubled the amount of pork consumed in the last three decades. As you can see in the same graph, in 30 years world-wide pork consumption increased with 83%.

Graph 10 Evolution of global pork production and consumption (1988-2018)²⁶



(Source: Agrivalue SA based on USDA)

²⁶ <http://solocampo.com/mercado-mundial-de-cerdos-argentina-en-el-puesto-13-de-los-productores-y-consumidores/>

The role of China in global pork consumption growth is anticipated to diminish due to an already-high level of per capita consumption.²⁷ With an expected annual consumption of 713 thousand metric tons in 2019 Argentina is the 13th biggest consumer of pork in the world.

Total global consumption of pork is projected to increase from 113 million metric tons in 2018 to about 131 million metric tons by 2027.

Global pork consumption on a per capita basis remains stable over the outlook period with consumption in most developed countries reaching saturation levels. Within developing countries, significant regional differences are evident in per capita pig meat consumption.

Growth is sustained in most of Latin America, where it has grown rapidly over the past few years, fueled by favorable relative prices that have positioned pork as one of the favored meats, along with poultry. Especially in Colombia, Mexico, Uruguay and some countries in Central America, where there is a high preference for beef, pork consumption has grown considerably. Since demand in the region is growing at a faster rate than domestic supply, these economies must import part of what they consume. Brazil is the main supplier of Argentina and Uruguay, while the markets of Colombia, Mexico and Central America are supplied by the United States.

Several Asian countries with favorable economic conditions which traditionally consume pork such as China, Philippines, Thailand, and Viet Nam – which is projected to become the highest consumer of pork on a per capita basis – are increasing consumption on a per capita basis at the regional level. Population expansion still supports growth in total pork consumption in these regions.²⁸

4.4 Global pork trade

According to Rabobank²⁹ pork trade will certainly continue to rise in the future. The four main exporters (the EU, the USA, Canada and Brazil) are expected to increase volumes available for world markets. These countries are increasingly competing in the same markets. Asia, and especially China, is the most important export destination. Russia has disappeared as an import country since 2014 and will become an exporter in the near future.

Import to Asia will continue to increase. In several other Asian countries, declining production and increasing demand will lead to more imports. South America and African destinations will slowly grow imports in response to increasing demand.

New free trade agreements (FTA's) and bilateral agreements can enable the future expansion of trade. Although they are currently insignificant in world trade flows, further processed products could become a more important part of international trade.

Competition in pork trade is expected to intensify. Competition between exports will increase to obtain the best carcass value. More than in the past, maximizing the value of all products will be a key to the profitability of companies.

The demand for pork continues to increase worldwide, with a strong focus on Asian countries. Product differentiation and the right product-market combinations will play an increasingly

²⁷ <http://solocampo.com/mercado-mundial-de-cerdos-argentina-en-el-puesto-13-de-los-productores-y-consumidores/>

²⁸ Agricultural outlook FAO (2018)

²⁹ Rabobank 2019

important role. The composition of products continues to adapt to the ever-increasing demand; from products with a low value, such as by-products, to products with a high added value.³⁰

Exporters will have to present in many markets in order to guarantee sales and respond to changing consumer behavior. Exporting companies will also have to respond to innovative, modern ways of marketing and transport.

Importing countries are constantly trying to maintain pricing pressure by increasing the number of suppliers. Creating strong relationships and adapting products to customer needs can partly circumvent price competition or at least better control of price volatility.

Pork trade will become more complex. Political issues, such as the recent trade dispute between the US and China, and animal health issues (such as Porcine Epidemic Diarrhoea or African swine fever) will continue to affect meat and feed trade worldwide³¹.

This problem can partly be addressed by spreading the risk of production in order to supply customers from multiple geographical locations. If an exporter has to deal with animal diseases, for example, importers will look to other suppliers. In turn, companies that have implemented regional diversification would then be able to approach the market from a different production area.

The extent of private sector stocks of pork and pig meat and the fall in demand for pork as Chinese consumers perceive human health risks from the ASF outbreaks could reduce the impact of African Swine fever in China.³²

A threat for the global pig sector could be the successful containment of the spread of Highly Pathogenic Avian Influenza (HPAI) and the strong potential for poultry meat to be used as a substitute for pig meat.

The unfortunate prospect facing Asian producers could bring opportunities for producers elsewhere, particularly those in Europe, the United States of America and Brazil. It is a rare combination of events that presents pig producers with higher prices, higher export volumes and lower feed prices.

But the data available for the spread of ASF so far would indicate that in Europe and the Americas pig producers may be about to enjoy precisely this situation. However, much still depends on how quickly and effectively China will be able to contain the ASF outbreak. The outbreak of ASF in Vietnam, Cambodia and Mongolia could add to pork production shortfall in Asia, further aggravating feed grain and oil meal requirements of the entire region. Under this scenario, producers from Europe and the Americas stand to benefit the most. They are among the largest exporters of pig meat and, at the same time, the leading importers of soybeans.³³

4.4.1 Global pork export

Of all the pork produced in the world only 7-7.5 % is marketed internationally. Pork production is evolving differently around the world. The four main exporters are all growing their exportable surpluses and are increasingly competing in the same markets. Each major producer is slowly takin

³⁰ <https://www.rabobank.nl/bedrijven/cijfers-en-trends/veehouderij/world-pork-map-2018/>

³¹ <http://www.fao.org/3/ca4526en/ca4526en.pdf>

³² <https://www.pigprogress.net/World-of-Pigs1/Articles/2019/4/Quarterly-update-Signs-of-change-in-global-pork-market-410742E/>

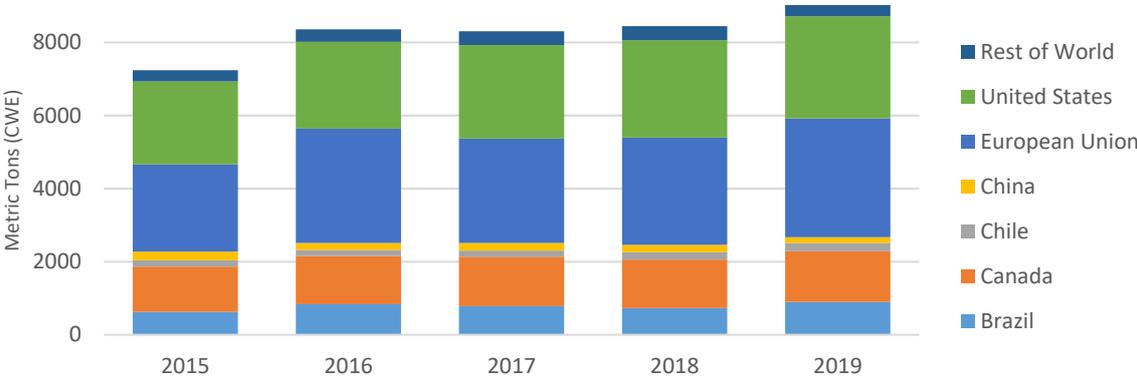
³³ <http://www.fao.org/3/ca4526en/ca4526en.pdf>

steps to differentiate its exports. Companies are also trying to build closer relationships with their foreign customers.

The world's largest pork exporters are the European Union, the United States, Canada and Brazil, whose sales amount to 91% of world exports³⁴, mainly frozen pork. On a global level more than 8.3 million metric tons of pork are traded (not including by-products and EU intra-trade).³⁵

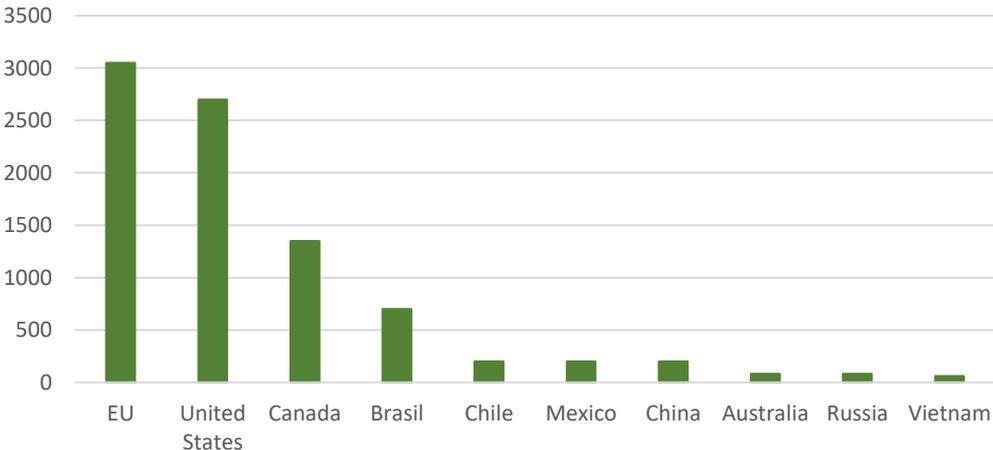
China’s global pork exports have been decreasing over the past few years, while the EU remained the top exporter with over three million metric tons of pork shipments last year, ahead of the United States and Canada. The United States is also among the main exporters and importers of pork worldwide. Mexico was the main importer of U.S. pork, followed by Japan, South Korea and Canada.

Graph 11 Exports of pork meat in million tons 2015-2019



(Source: Agrivalue SA based on USDA data)

Graph 12 Main global pork exports in 1.000 MT (2018)



(Source: Agrivalue based on Statista.com 2018)

As mentioned before the European Union³⁶ is at the forefront of countries producing pork and beef. This meat, known for its quality and taste, finds recipients all over the world.

³⁴ Rabobank (2018)

³⁵ <https://www.rabobank.nl/bedrijven/cijfers-en-trends/veehouderij/world-pork-map-2018/>

³⁶ <http://www.meatfromeurope.eu/blog/news/pork-and-beef-from-the-eu-desirable-on-global-markets/>

In 2018, the EU maintained its leadership status in pork export and a high position in the export of beef to non-EU countries.

Pork exports from Europe to third countries were slightly higher than a year earlier: 3.87 million tons compared to 3.84 million tons in 2017. In the first four months of 2019, export increased by as much as 13.2% compared to the same period a year earlier. The unprecedented supply loss in China due to ASF has altered global trade flows and will continue to do so. In the first 5 months of 2019, EU exports to China increased 41% compared to 2018.

The export of dried and smoked pork is growing dynamically. In 2018, its value increased compared to the previous year by 7.6%, and the volume by as much as 9%. The main recipients of this type of products are the United States (increase in export volume by as much as 15.7%), Japan, Australia, Switzerland, Serbia, and Canada (increase in export volume by 3%)

Pork sausages are very popular among international buyers. While the volume of export remains stable, the value of goods sold is increasing – this means that importers are willing to pay more for sausages from the European Union.

2018 would be characterized by a rising worldwide pig production that would cause the United States to need to export more while China will seek to import less. The tariffs imposed by the Asian giant on pork from the United States generated greater pressure from US exporters on other Asian buyers such as Japan and Korea.

The Russian embargo on Brazil, on the other hand, motivated Brazilian exporters to try to place their pig products in the Chinese market. All these commercial strategies were developed in a market with abundant supply that pressed world prices down, while remaining alert as to how African swine fever developed in China.

This last factor is particularly relevant given the fact that the massive outbreak of Swine Fever in China modified the supply chain of the main producer and consumer of pig products with greatly impact to the world pig market in 2019. In addition, after the recent confirmation of cases of African swine fever in Belgium, an important opportunity emerged for the main American pork exporters (United States, Canada, Brazil, Chile, Argentina, etc.).

For 2019 global exports are forecast 8% higher, fueled by rising demand from China and steady economic growth in most major pork markets. The EU will remain the top exporter with shipments up 11% year-over-year. Brazil, Canada, and the United States are also forecast higher in 2019.

A large breeding herd and improvement in productivity is expected to cause a 5.5% rise in **USA** pork production in the second half of 2019 compared to 2018. The resolution of trade terms of Mexico and Canada should boost USA exports.

Demand from China and Russia are driving exports from **Brazil** in 2019 and while exports outpace production growth, while their domestic pork prices increase.

China remains the biggest source of demand, with imports forecast 41% higher due to an ASF-induced decline in production. By the end of 2019, the total swine inventory will be down 13% to 374 million head. Official Chinese figures show breeding herd numbers were nearly 27% year-on-year at the end of June 2019, and the overall herd 26% down. But herd losses in some regions are believed to be as high as 40-60%, with overall losses estimated at 40%. New cases are still being regularly reported.

Large inventories have been preventing significant price rises, but that is changing, with live pig prices 15% up in July and 40% higher year-on-year, and pork prices 20% up in July compared with June. Chinese pork imports rose 62% in May and were 20% up in the first five months of the year.

ASF is also spreading rapidly in Vietnam, where production could be 20% down in 2019, as well as Cambodia and Laos and has been detected in North Korea. Rabobank expects that the unprecedented supply loss in China has altered global trade flows and will continue to do so.

The effect of the delicate Chinese situation are amongst others:

- EU pork exports to China were up 41% year-on-year in the first five months of 2019. However, ASF is stifling expansion in Eastern Europe, it added.
- EU fresh and frozen pork exports to China were up 88% year-on-year in May, to 96,500 tonnes, accounting for 44% of EU exports;
- Value almost trebled, as average prices rose from €1.48/kg last May to €2.09/kg;

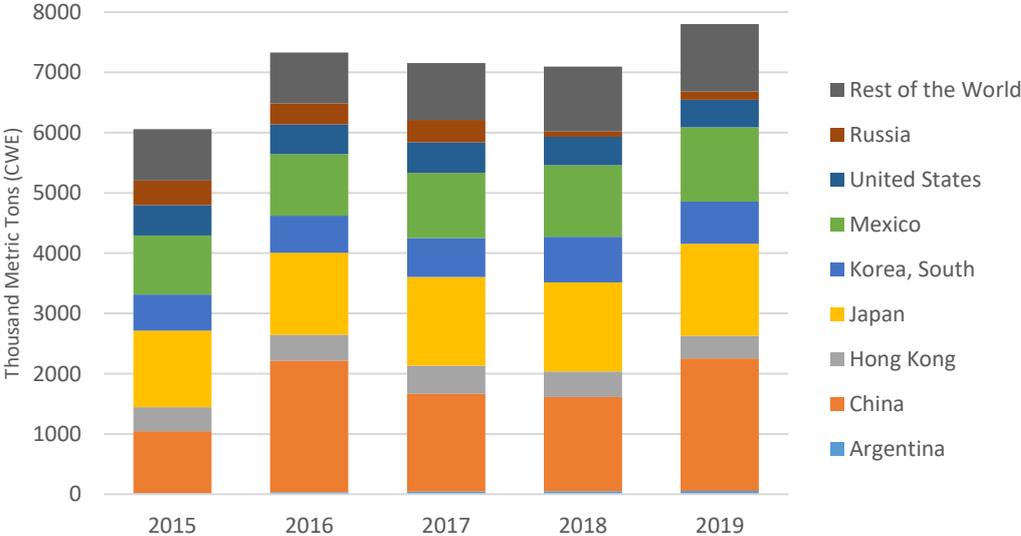
4.4.2 Global pork import

Regarding imports, the economies with the highest volume of pork demand are China, Japan, Mexico, South Korea, Hong Kong and the United States. These 6 countries combined, concentrate 74% of world imports. Imports in Argentina do not exceed 50.000 tons, the country is ranked 15th in the list of main pork importers.

China stands out as the main importer, surpassing Japan since 2017. In 2018, Chinese pork imports reached 1.56 million metric tons, representing 19% of total imports. Chinese imports doubled in the last 5 years, with the European Union being the main supplier, followed by Canada and the United States.

The third largest importer in the world is Mexico, whose purchases amounted 14% of the imports in 2018 (1.2 million tons). Mexico is a key importer because of the size and dynamics of its economy. In the last decade, purchases from this country grew at an average rate of 9% per year. In fourth place, South Korea is positioned with 8% (645.000 tons) and Hong Kong and the United States with 6% share each, around 500.000 imported tons.

Graph 13 Imports of pork meat (thousand metric tons)



(Source: Agrivalve SA based on USDA data)

According to USDA data, in 2019, Chinese pork production will decrease by 9% to 48.5 million metric tons, with the reduced supply only slightly offset by weakened demand to cover the domestic supply gap, China will increase pork imports by 71% to 2.2 million metric tons. As the world's top pork consumer, China imported a record volume of meat in May 2019, trying to mitigate the impact of African swine fever as domestic pork prices rebound. Pork imports already increased 63% in May 2019 from a year earlier.³⁷

Japan will boost imports on strong demand for red meat while tariff reductions from newly implemented free trade agreements will stimulate demand for Canadian and EU pork. After a record-setting 2018, Korea will reduce imports due to high stocks and growing domestic production.³⁸

Table 14 Pork trade selected countries 2015-2019 (* 1.000 metric tons carcass weight equivalent)

Total Imports	2015	2016	2017	2018	2019 (Apr)	2019 (Oct)
China	1.029	2.181	1.620	1.561	2.200	1.875
Japan	1.270	1.361	1.485	1.481	1.525	1.525
Mexico	981	1.021	1.083	1.188	1.235	1.235
South Korea	599	615	645	753	700	685
United States	506	495	506	473	456	481
Hong Kong	397	429	463	423	375	490
Philippines	175	195	241	286	315	300
Canada	216	215	222	233	255	235
Australia	220	210	215	216	230	230
Colombia	64	66	99	128	150	180
Russia	408	347	374	87	135	40
Others	854	846	940	1.077	1.190	1.121
World Total	6.719	7.981	7.883	7906	8.766	8.397
Total Exports	2015	2016	2017	2018	2019 (Apr)	2019 (Oct)
EU	2.390	3.130	2.858	2.934	3.250	3.150
United States	2.272	2.376	2.554	2.663	2.801	2.813
Canada	1.239	1.320	1.351	1.330	1.390	1.365
Brazil	627	832	786	730	900	735
Chile	178	173	171	200	220	195
Mexico	128	141	170	178	185	190
China	231	11	208	203	160	150
Russia	7	25	37	45	50	50
Australia	36	38	43	47	45	45
South Africa	17	15	18	19	20	20
Serbia	19	11	16	14	16	12
Others	93	103	96	83	46	65
World total	7237	8.355	8.308	8.446	9.083	8.790

(Source: Agrivalve based on FAS USDA 2019)

³⁷ <https://www.bloomberg.com/news/articles/2019-06-24/china-meat-imports-hit-record-as-pork-prices-jump-on-swine-fever>

³⁸ https://apps.fas.usda.gov/psdonline/circulars/livestock_poultry.pdf

4.5 China and Latin America³⁹

As mentioned before China produces and consumes two-thirds of the world's pork. However due to the African Swine Fever the country is destroying herds and blocks shipments to stop ASF. Importers are filling the gap, with a 40% increase in both prices and imports expected this year.

The disease was first reported in August 2018 in China's northeast. Since then, about one million pigs have died and the disease has spread to 31 of China's 34 provinces, according to the UN's Food and Agriculture Organization (FAO). The virus, which is not communicable to humans, can be spread by live or dead pigs, and via pork products. Death can occur within a week of infection. There is no treatment or vaccine. The only way to stop the disease is to cull all affected or exposed swine. If this happens, there will not be enough surplus pork in the world to meet the anticipated shortfall in production.

The increase in imports comes at the cost of numerous smaller and potentially more climate-friendly domestic pig farmers.

Since 1970, per capita consumption of pork in China increased more than fourfold, from 25 grams per day to over 100. About half of all pigs in China are raised in small to medium scale pig farms⁴⁰. These farms have long been the most challenging to regulate in terms of waste management, antibiotic use and animal welfare.

At between 2-3% imported pork is still fractional in China. The US was the main source, but has been replaced by European countries such as Germany and Spain in recent years.

China's pig industry is fragmented and there are many small farms that may not have the correct security measures needed to control the spread of the disease. Furthermore, the virus can survive in pork products for months, meaning it can be reintroduced into herds by accident.

For many Latin American pork-producing countries, the Chinese market has been a major ambition due to its size. For years, they have been working to either get clearance to start exporting or to expand the number of companies authorized to do so. There are pending issues to solve such as lowering the use of antibiotics and a better management of effluents.

The African swine fever crisis means that work to pay off, but it also presents a challenge. The same countries with export aspirations could see soy and corn shipments drop as China's declining pig stocks require less food.

In Brazil, the soy industry expects U\$2 billion in losses this year. But if pig farming can compensate, the result could be positive in terms of job creation as it generates more employment than soy.

Argentina could export up to three million metric tons less soy next year, according to a report by the Buenos Aires Grain Exchange. This would be partly offset by the more than 18.000 metric tons of pork it hopes to ship. Upscaling pork production safely in order to export to China could prove challenging. More information about Argentina can be found in chapter 6 of this document.

Chile is currently the fifth largest exporter of pork in the world. ChilePork, the national producers' association has successfully deployed marketing strategies at trade fairs in Asia to boost recognition of their products.

³⁹ Dialogo Chino "China looks to Latin America as swine flu hits" by Fermin Koop and Manuela Andreoni (2019)

⁴⁰ NGO Brighter Green by Wanqing Zhou (2019)

Pork production in Chile has grown from 59.000 tonnes in 1984 to the 534.000 today. Pork is now the fourth most exported product in the country. Over 60% of production is exported. China, recipient of 73.000 tonnes last year, the principal destination.

“Producing countries like Chile could benefit from greater pork demand, but if the situation is more serious than what is being reported, there won’t be a sufficient supply to cover China’s demand. Prices of pork and other meats will be on the rise,” according to Mr Domínguez, head of ChilePork.

Exports have also increased from Brazil. In May alone, exports were up 41% compared to 2018, from 47.700 tonnes to 67.200. Luizinho Caron, a researcher at Embrapa, the Brazilian Agricultural Research Corporation, says greater demand means prices and profits are higher. However, producers know the hike is temporary and don’t want to invest to grow capacity.

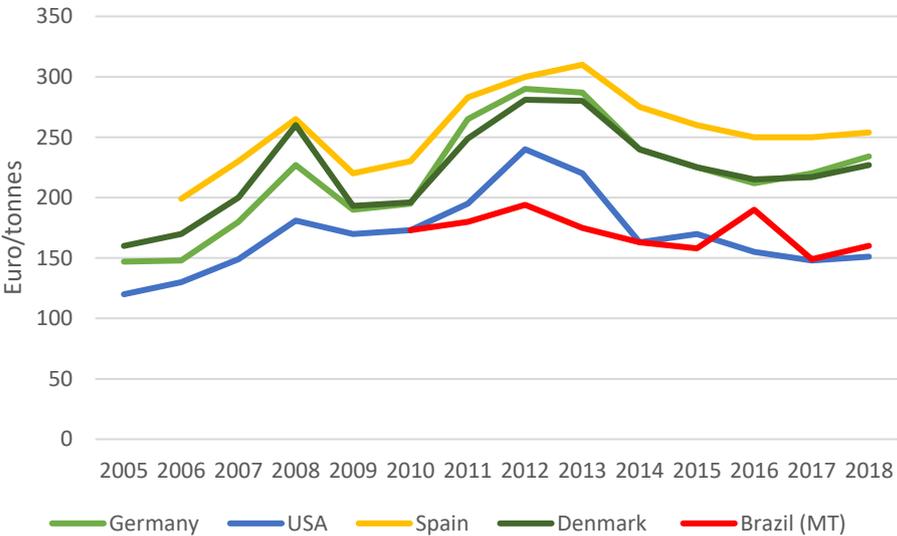
With the doors to China’s opened many are adapting their plants to meet Chinese importers’ standards. Not all plants are ready to export, this will possibly stimulate them to get the know-how.

4.6 Global Pork Input Prices

InterPig and Agribenchmark are two complementary networks which are benchmarking the leading global pig production countries based on 19 countries and almost 90 pig farms. Preliminary data on 2018 are presented hereafter in order to put the Argentine pig sector into global perspective.

As graph 14 shows the average feed price for finishing pigs is highest in the European Union compared to Brasil and the USA.

Graph 14 Average price of purchase finishing pigs feed Euro/metric tonnes⁴¹ (2005-2018)

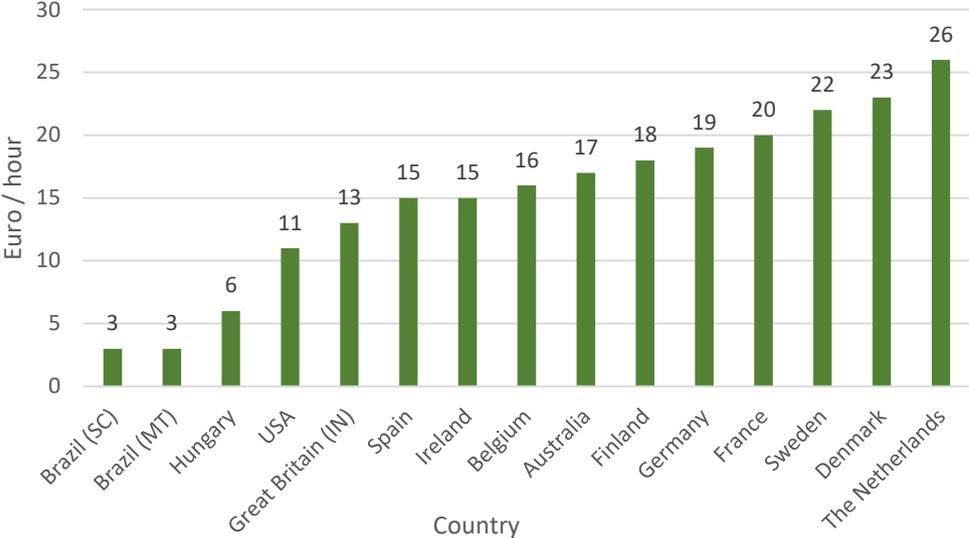


(Source: Agrivalue SA based on Interpig 2018, Agribenchmark, Thünen)

⁴¹ PC19_GF_Deblitz_Christiansen_China_Competitiveness_19070. Dr. Claus Deblitz of the Thünen Institute of Farm Economics in Germany presented during Agribenchmark - InterPIG Pig Conference 2019 “The competitive situation and perspective of Chinese pig production”.

Labour costs are the highest in the Netherlands, followed by other countries within the European Union, except Hungary. Australia neither can compete with the labour values as managed in the USA and especially Brasil.

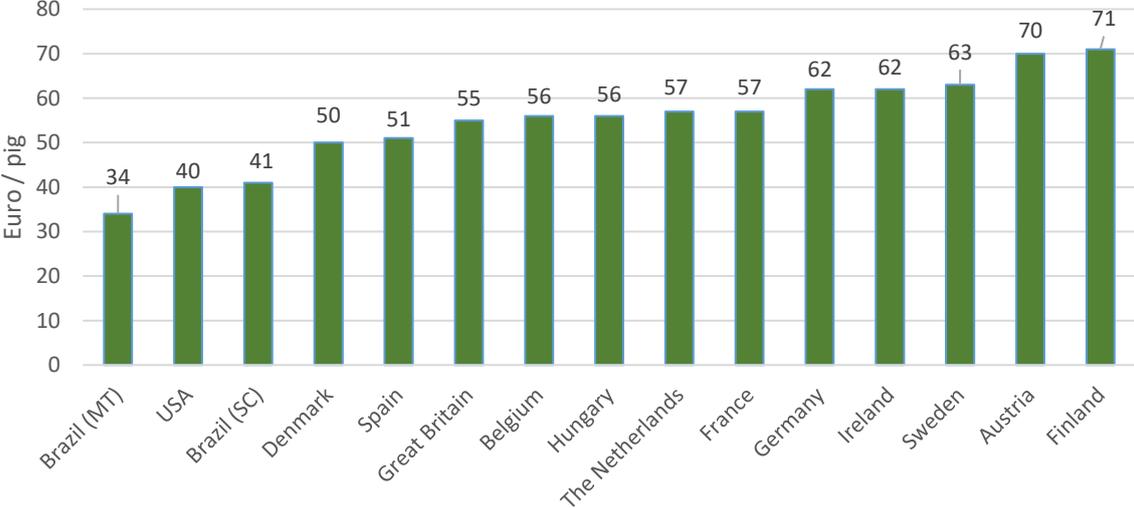
Graph 15 Cost of Labour, Euro per hour (2018)



(Source: Agrivalue SA based on Interpig 2018, Agribenchmark, Thünen)

Piglet costs are the highest in Finland, Austria, Sweden and Ireland, while the farmer pays considerably less for its piglets in Denmark, Brasil and the United States.

Graph 16 Piglets cost at 30 kg (Euro / kg)

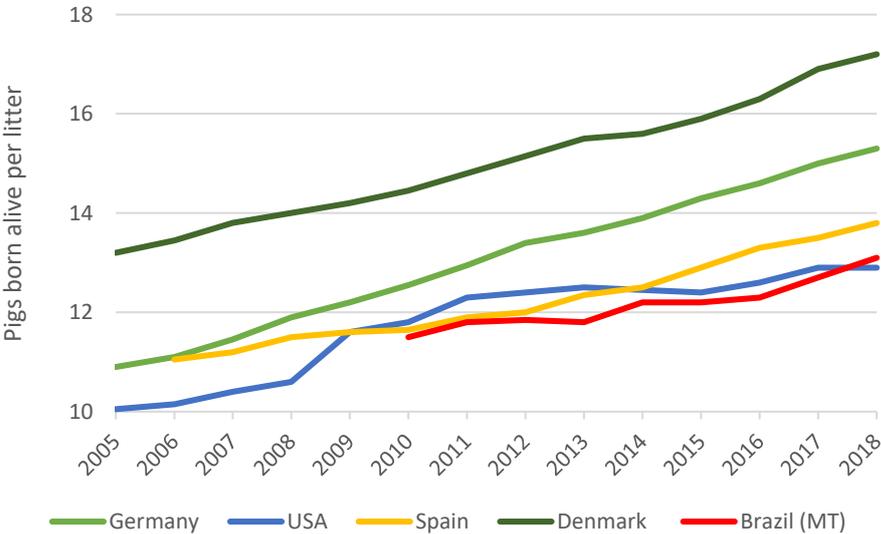


(Agrivalue SA based on Interpig, Agribenchmark, Thünen data)

The last couple of decades lean growth and feed efficiency have dramatically improved average pig weight for market in the main pig producing countries. Productivity of the average pig farmer has increased, with pigs per litter and average market hog weights both increasing. A sure sign that a farrow-to-finish operation is successful is that pigs remain profitable at heavier market weights.

When we take the average number of pigs born alive per litter into account the European countries (Germany, Denmark and to a lesser extent Spain) score a higher productivity than their colleagues from Brazil and the USA.

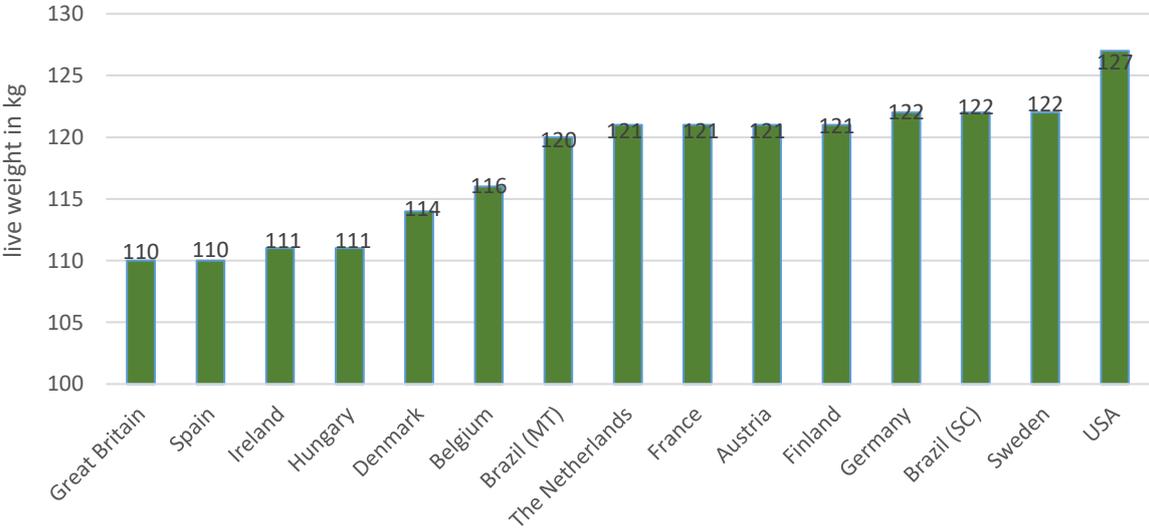
Graph 17 Pigs born alive per litter (2005-2018)



(Source: Agrivalue SA based on data Interpig 2018, Agribenchmark, Thünen)

The average live slaughter weight is the highest in the USA, followed by Sweden, Brazil and Germany (more than 120 kg), while England, Spain, Ireland and Hungary are showing significant lower live weight values at slaughter (less than 112 kg).

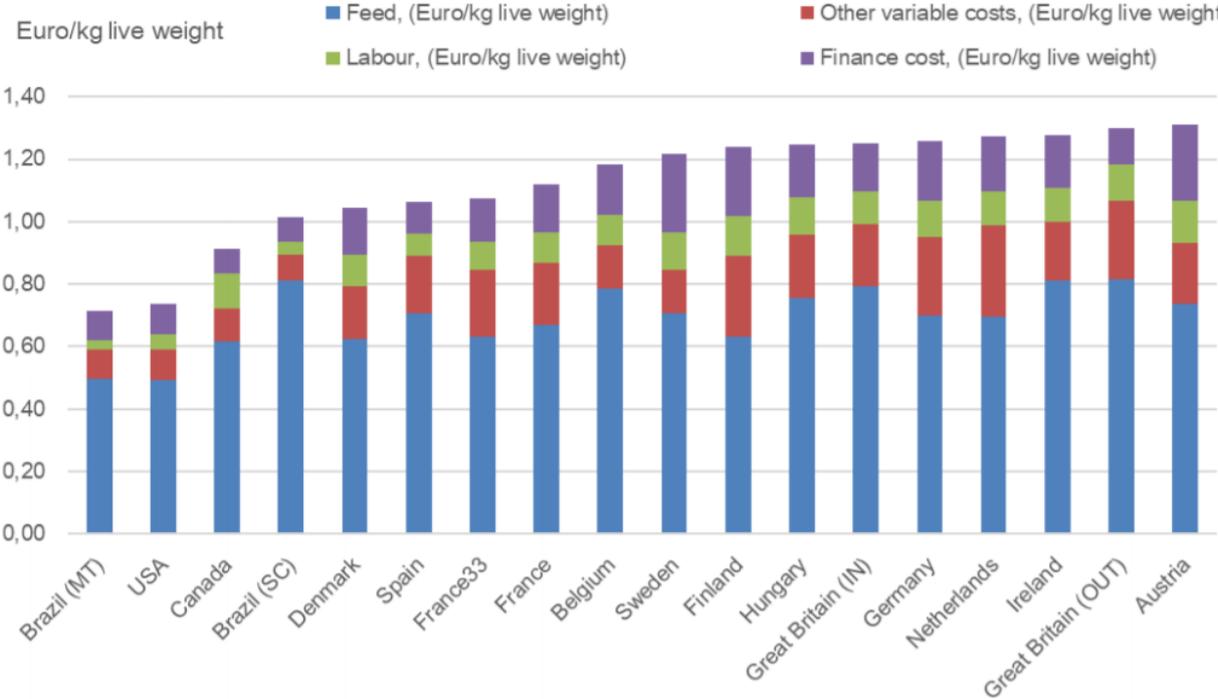
Graph 18 Average live weight at slaughter (kg) (2018)



(Source: Agrivalue SA based on Interpig 2018, Agribenchmark, Thünen data)

The total cost per kg live weigh are the highest in Austria, followed by Ireland, The Netherlands, Germany and Great Britain. In Canada and The USA pork can be produced at low costs (less than 1 Euro), but most competitive production takes place in Brasil, where the total costs per kg live weight expressed in Euro is less than 67 Eurocents.

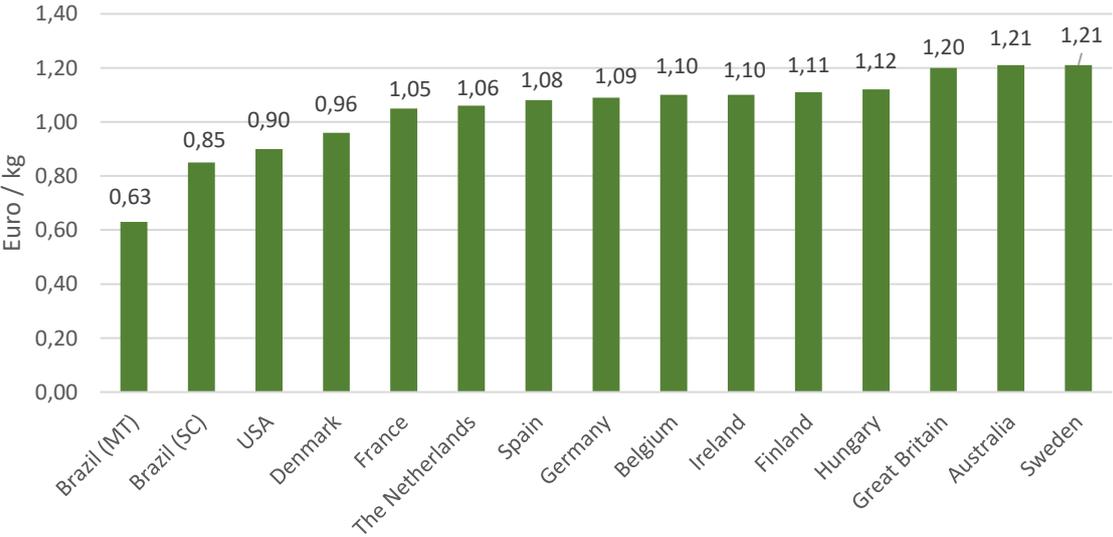
Graph 19 Total cost per kg live weight in Euro/kg (2018)



(Source: Interpig 2018, Agribenchmark, Thünen data)

As the previous graph showed Brasil has a very low cost level, but on the, the country also is receiving a relatively low value for its products. Denmark and The United States receive less than one (1) Euro per kg live weight, while Brasil receives only 63 cents. In Sweden pig producers receive the highest value per kg live weight, to be exactly one Euro and twentyone cents (€ 1.21).

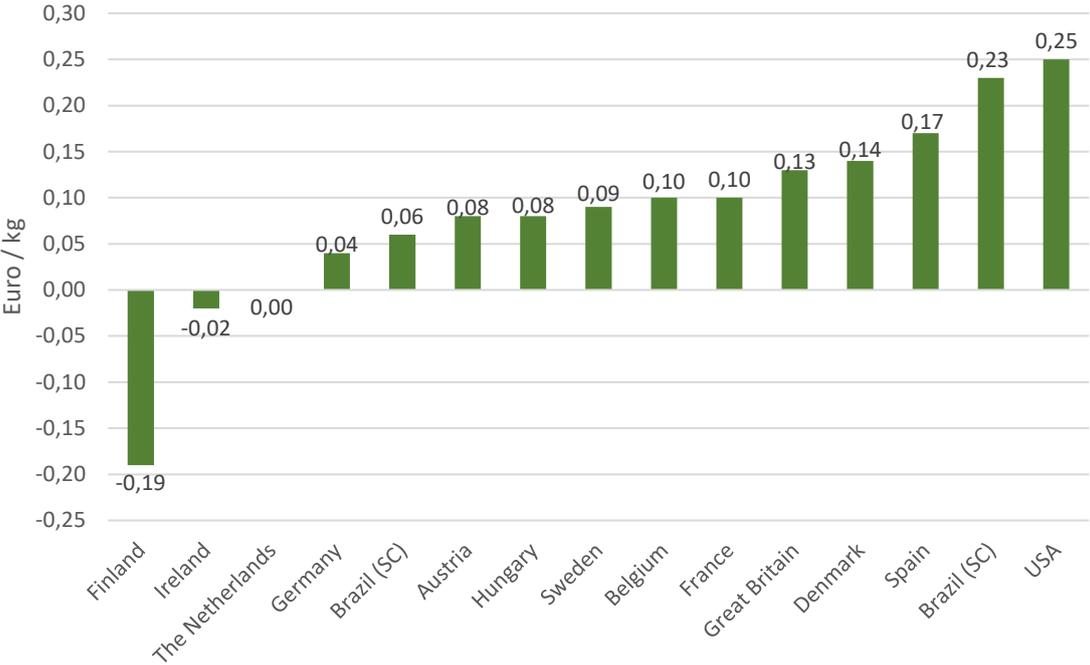
Graph 20 Obtained price, Euro / kg live weight (2018)



(Source: Agrivalue SA based on Interpig, Agribenchmark, Thünen data)

In 2018 the highest profit is obtained by the USA farmer, followed by their colleagues from Brasil, Spain and Denmark.

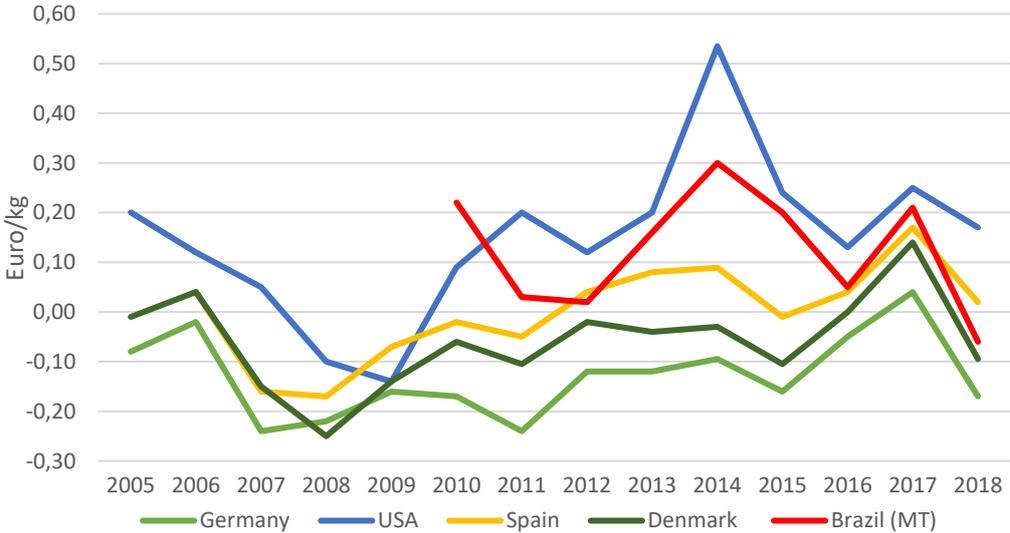
Graph 21 Average net profit (Euro/kg live weight) in 2018



(Source: Agrivalue SA based on Interpig, Agribenchmark, Thünen data)

Graph 22 shows the average net profit expressed in Euros per kilogram slaughterweight during the period 2005 until 2018 in the USA, Germany, Denmark, Spain and Brazil. In almost every year the USA farmer has obtained the highest profit for its pig production activity.

Graph 22 Average net profit (Euro / kg slaughterweight) (2005-2018)



(Source: Agrivalue SA based on Interpig, Agribenchmark, Thünen data)

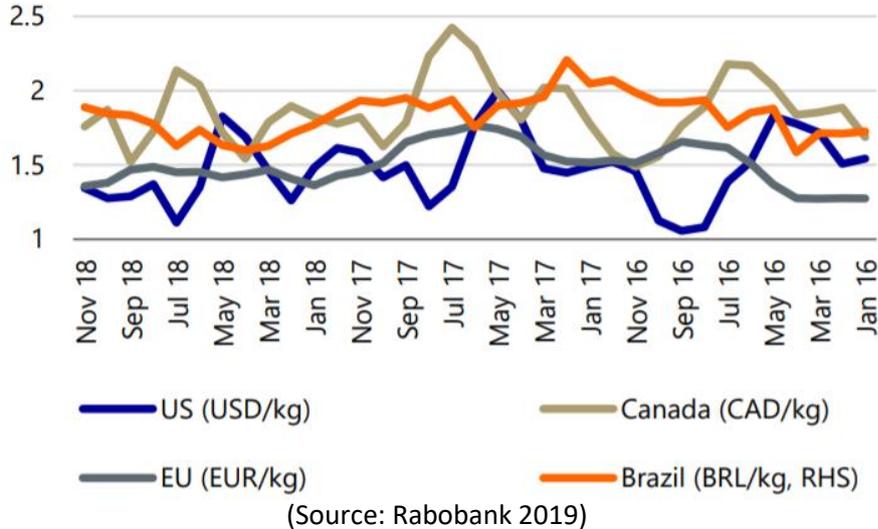
Market speculation has contributed to the volatility in international prices and the pressure for further price appreciation will force traditional pork importers such as Mexico, Japan and South Korea to proactively compete for pork supplies, resulting in higher costs.

As ASF continues to spread in China, prices are starting to rise, indicating tight supply. Since mid-June 2019, live hog prices have increased with 40% compared to 2018.

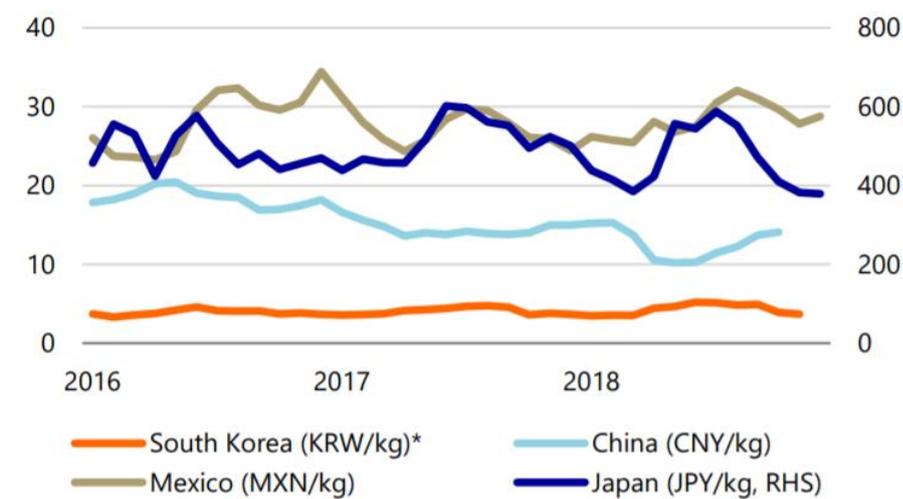
Large inventories of frozen meat continue to pressure prices and weigh on market returns. Pork imports in May increased substantially with more shipments expected in the second half of 2019.

Meanwhile, the spread of ASF in Eastern Europe is discouraging expansion and high temperatures are slowing production growth, contributing to better market prices. Exports have increased from most member states, mainly driven by strong demand from China.

Graph 23 Pork prices in exporting countries (January 2016- November 2018)⁴²



Graph 24 Pork prices in importing countries (January 2016- November 2018)⁴³



Note: for display purposes the South Korean won has been divided by 1.000
 (Source: Rabobank 2019)

⁴² RaboResearch-Pork Quarterly Q1 2019 (January 2019) – Thomson Reuters Eikon, Macrobond, Porcimex, ALIC
⁴³ RaboResearch-Pork Quarterly Q1 2019 (January 2019) – Thomson Reuters Eikon, Macrobond, Porcimex, ALIC

5 GLOBAL PIG BUSINESS ENVIRONMENT DEVELOPMENTS

5.1 Animal health

With the objective to compare the Argentine pork sector with its (future) competitors within the international market (sales market as Russia and China) in this report the animal health policy of the European Union, the United States and the intergovernmental organisation responsible for improving animal health worldwide (OIE) are highlighted.

5.1.1 European Union

The EU animal health policy is the result of decades long development in the fight against transmissible animal diseases (often epidemics) and covers all animals in the EU kept for food, farming, sport, companionship, entertainment and in zoos. It also covers wild animals and animals used in research where there is a risk of them transmitting disease to other animals or to humans.

It protects human and animal health and welfare as well as food safety as it is working towards high animal health status of livestock, poultry and fish by controlling animal disease outbreaks and by surveillance and eradication programmes. It ensures smooth and safe internal EU market (including introduction into the EU) of live animals and products of animal origin (including animal by-products) by legislative and non-legislative measures. It works under the motto "prevention is better than cure".

It is also strongly linked to the international standards of the relevant standard setting body (World Organisation for Animal Health, OIE) and the EU's obligations under the Sanitary and Phytosanitary (SPS) Agreement in the context of the World Trade Organisation (WTO). This Agreement is aimed at minimising the negative effects of unjustified health barriers on international trade.

The production of pork in Europe is based on a precisely normalized system of Community⁴⁴ regulations, of which the first priority is to ensure the safety of the raw material produced while maintaining the highest protection of animal health and welfare.

Standards implemented in the EU legislation resulting from, among others, Good Agricultural Practices (GAP) place particular emphasis on the production of safe food while maintaining sustainable economic development, social cohesion and environmental quality.

Thanks to Community solutions implemented in the countries of the European Union, animal breeding is based, among others, on the following principles:

- prohibition on the use of hormones, growth promoters and adding antibiotics to the feed for non-therapeutic purposes;
- providing animals with specific living conditions that protect their health and well-being;
- continuous monitoring of animal welfare and documentation at each stage of rearing;
- supervision of the conditions and time of animal transport to the slaughterhouse in order to reduce ante-mortem stress.

The European tradition in pork production and decades of experience in its improvement allow to produce pork with excellent technological parameters, high culinary quality and excellent taste qualities. The production process takes into account selection and measurements at each stage, which enable constant supervision over the created quality. It is a consequence of the planned process in which the selection of breeds, care for nutrition and animal welfare, control of the

⁴⁴ <http://www.meatfromeurope.eu/meat/pork/>

slaughter parameters, the manner and conditions of meat packaging create the quality of the final product at a high level.

5.1.2 United States

In the USA there is a coalition that is focusing on prevention and response planning including the National Pork Board, the National Pork Producers Council (NPPC), the American Association of Swine Veterinarians (AASV), the Swine Health Information Center (SHIC), USDA, state pork associations and others.

These groups are working together to gather intelligence, engage subject matter experts, assess risk and determine appropriate ongoing actions to address animal health issues, like in the case of the current threat of African Swine Fever. Keeping all of the various sectors informed and prepared is key, but prevention is the first priority.

Some of the latest steps this coalition has taken to protect U.S. pig herds include:

- New resources from the Pork Checkoff, including everything from biosecurity information for show pig youth to revised guidelines for traveling abroad and hosting international visitors on the farm
- Call for new research proposals to help the Pork Checkoff find solutions that prevent FADs from reaching the United States or to mitigate them if they do
- Increased measures announced by USDA to better protect U.S. borders from entry of ASF, including adding 60 beagle teams for a total of 179 at key U.S. commercial, sea, and air ports to check for illegal pork/pork products entering the U.S.
- In an abundance of caution, NPPC's cancellation of World Pork Expo in June
- SHIC's ongoing global disease monitoring to help inform decisions
- AASV delivering disease information, including clinical signs, so its membership can perform frontline passive surveillance for ASF
- Checkoff's ongoing ASF scenario response drills around the country

The main goal is to use their collective resources to protect U.S. pig farms from the potentially devastating disease threat ASF is.

If African swine fever (ASF), foot and mouth disease (FMD), classical swine fever (CSF), or another foreign animal disease (FAD) is found in U.S. livestock, regulatory officials will limit movement of animals and animal products to control the spread of these very contagious animal diseases.

A key part of keeping FAD from reaching the USA and to limit spread if an outbreak occurs is participation by all stakeholders in the industry's Secure Pork Supply (SPS) plan⁴⁵.

It will be easier for participating pork premises with healthy animals to:

- Move animals to processing or to another pork production premises under a movement permit issued by regulatory officials, and
- Maintain business continuity for the pork industry, including producers, haulers, and packers.

Five steps to a Secure Pork Supply:

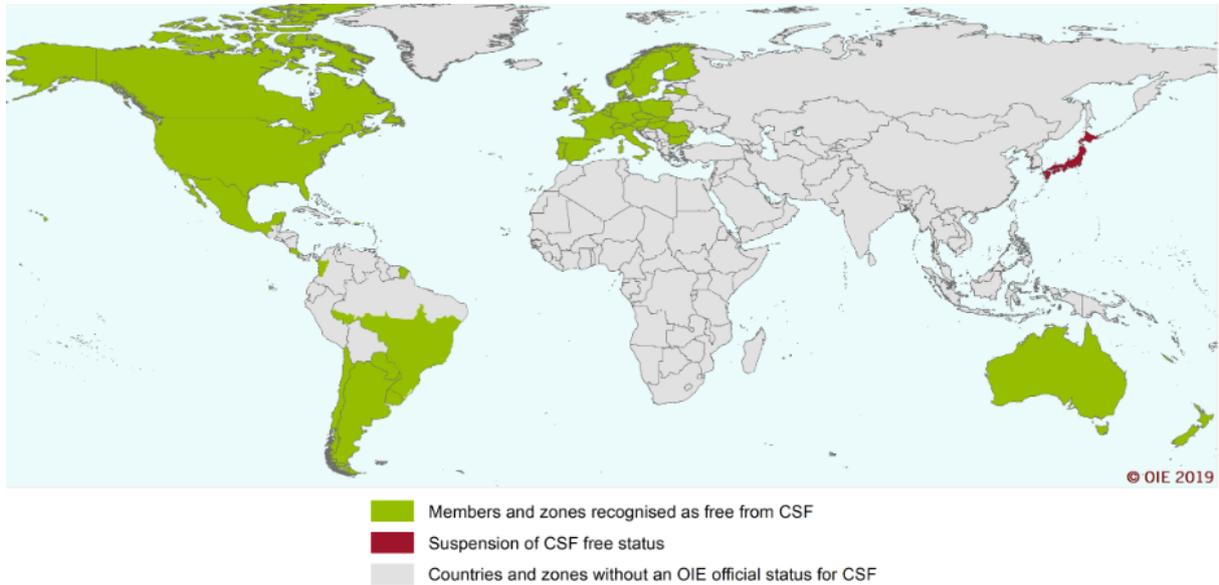
1) Get a national premises identification number (PIN);

⁴⁵ National Pork Board, Des Moines, Iowa USA (2019)

5.1.4 Global status main pork diseases

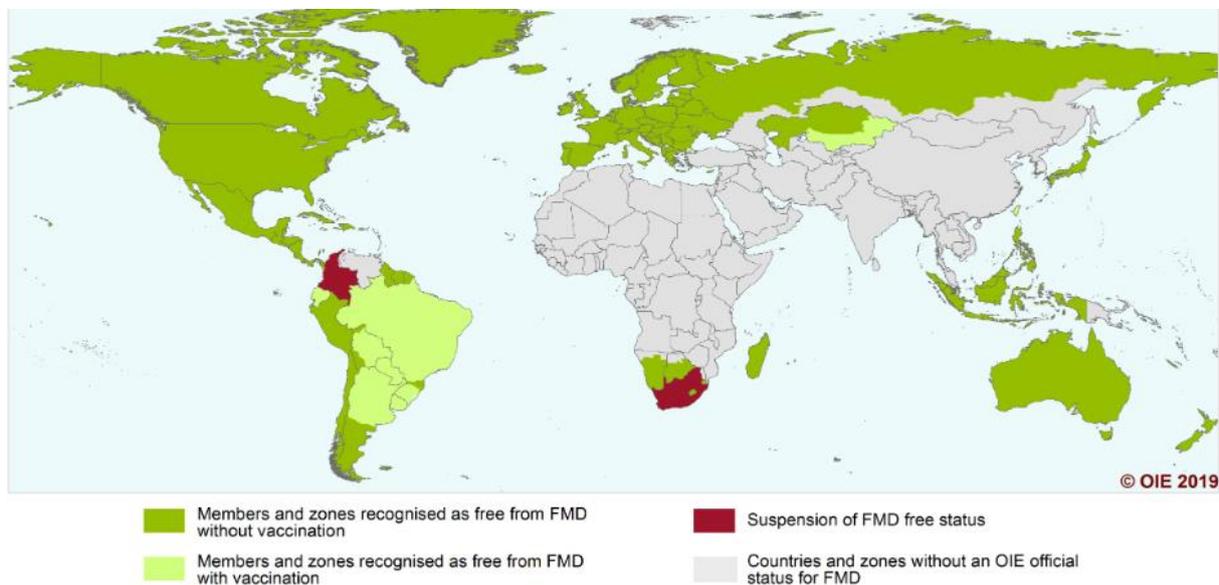
Rising disease pressures are challenging the global market⁴⁶, specifically African Swine Fever (ASF) which continues to negatively affect production in Asian countries and adds uncertainty to trade and production prospects in other parts of the world. While China’s pork prices begin to rise, production responses in the rest of the world appear cautious.

Image 5 Map of OIE Member’s Classical Swine Fever Status (May 2019)



(Source: OIE - WAHIS Interface 2019)

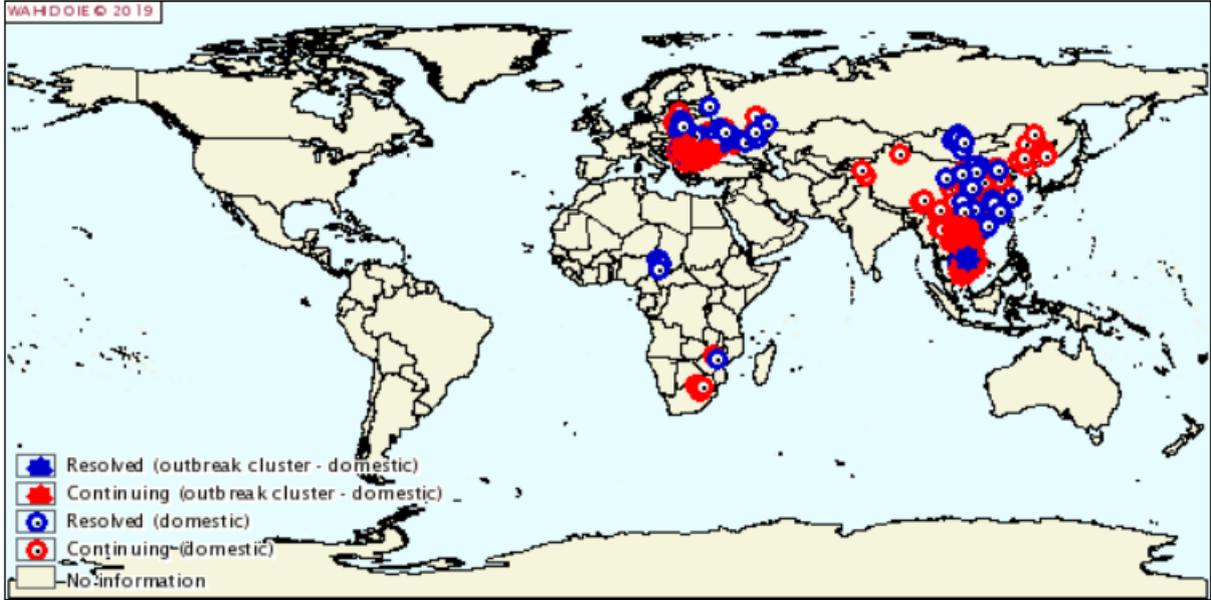
Image 6 Map of OIE Member’s Foot and Mouth Disease Status (May 2019)



(Source: World Organisation for Animal Health 2019)

⁴⁶ Rabobank Research (August 2019) by Natalie Berkhout

Image 7 African Swine Fever Outbreak Map (August 2019)



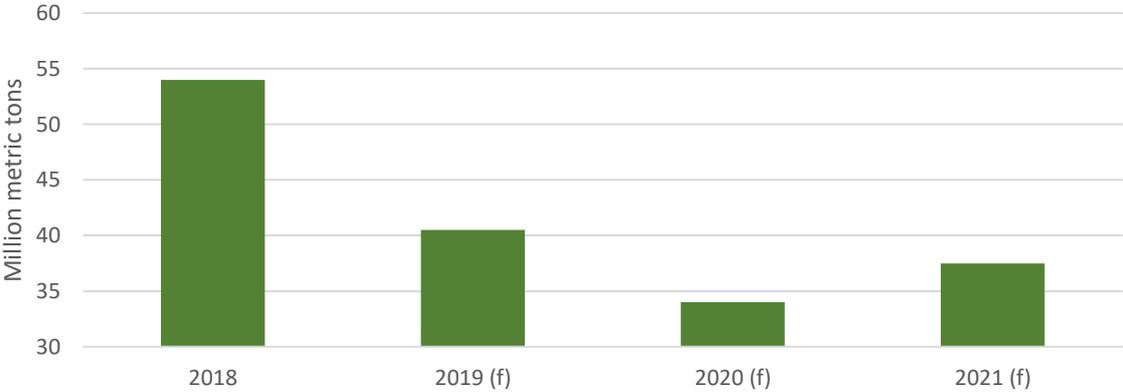
(Source: OIE 2019 - WAHIS interface)

It is estimated that China’s current herd loss due to African Swine Fever (ASF) in August 2019 is already 40% less compared to their herd in August 2018 and it may expand to over 50% by the end of 2019.

However, due to a large slaughter earlier in 2019, it is expected that the country’s pork production will drop at a slower pace, down 25% for the year with an additional 10 - 15% decline in both herd and pork production in 2020.

Meanwhile, ASF is spreading rapidly in Vietnam, Laos and Cambodia while new cases were recently detected in North Korea. It is estimated that all Asian pork herds are at risk of ASF within the year. Europe remains challenged by ASF outbreaks but mainly in wild boar. Disease pressures are expected to affect global animal protein production for more than 5 years, and in the case of China, it may take even longer (see graph 25 below).

Graph 25 Estimated impact of ASF on China’s pork production (2018 – 2021)



(Source: Agrivalue SA based on Rabobank data 2019) (f=forecast)

5.2 Animal Welfare

Perceptions of animal welfare differ from one region to another and between one culture and another, as do and the ways animals contribute to human society. It is for this reason that the OIE’s work in developing international standards must have a solid scientific basis, must involve wide engagement of all stakeholders, must ensure a holistic view of the systems within which animals are kept and used by humans, and must aim to have a tangible impact on animal welfare.

In May 2017, all OIE Member Countries adopted the first Global Animal Welfare Strategy, which had been presented at the 4th Global Conference on Animal Welfare, which took place in Guadalajara (Mexico) in December 2016⁴⁷.

The strategy includes the following four pillars:

- Development of animal welfare standards;
- Capacity building and education;
- Communication with governments, organisations and the public;
- Implementation of animal welfare standards and policies.

The welfare of pigs is assured by Council Directive 2008/120/EC in the European Union.

Inspired by tiered schemes in Germany, the Netherlands and Denmark, the UK wants to create a brand based on the best animal health and welfare standards in the world using funding available under a UK agricultural policy to provide incentives to ratchet up their already world-leading animal welfare standards. The UK pig sector does not want to be undercut by imports of pork from countries with lower welfare standards, but on the other hand they do not want either to risk pushing up costs and sucking lower standard imports in.

The ‘Animal Welfare Matrix’⁴⁸ outlines the different welfare labelling schemes and legislative requirements in place across selected key pork producing countries – the UK, Denmark, Netherlands, Germany, Spain, Poland, the US, Canada and Brazil. Sweden is also included because of its high animal welfare standards. A summary of the regulatory differences highlighted in the Animal Welfare Matrix are presented in the following table:

Table 15 Different welfare labelling schemes and legislative requirements in selected regions

Subject	Region – Country	Status	Description
Sow Stalls	UK and Sweden	Banned	Banned since 1999
	Most of EU	Permitted	for up to four weeks after service
	United States	Banned	in nine states (in some cases from future dates). Permitted in the rest for entire 16-week gestation period. Major pig production companies Smithfield Foods and Hormel Foods are planning to phase out ‘gestation crates’ this year.
	Canada	Permitted	However, all holdings built or rebuilt after July 2014 must group house mated gilts and sows, although stalls may be used for up to five weeks.

⁴⁷ Fourth OIE Global Conference on Animal Welfare – Animal welfare for a better world Guadalajara (Mexico), 6–8 December 2016

⁴⁸ “Animal Welfare Matrix” compiled by NPA senior policy advisor Georgina Crayford

	Brazil	Permitted	The biggest pork producer BRF is phasing them out by 2026 and the second biggest, Seara, is 'gestation stall free'.
Farrowing crates	Sweden	Banned	Although temporary crating is permitted at farrowing in exceptional circumstances.
	UK and most of rest of EU	Permitted	Sows may be kept in farrowing crates from seven days before farrowing until weaning.
	Brazil, US and Canada	Permitted	legally permissible
Straw-based/out door systems	UK		40% of sows are outdoors, 90% of indoor sows and 60% of finishing pigs are kept on straw, 2-3% of finishers are free range and 0.6% of production is organic.
	Sweden		more than 90% of sows and finishers are kept on straw. But just 1% of Swedish pigs are kept outdoors and these are all organic.
	Rest of EU, US, Canada, Brazil		very few, if any, pigs are kept outdoors or on straw indoors. Most are kept on slatted floors. Very few organic pigs
Use of antibiotics for growth promotion	UK and most of the EU	Banned	Banned since 2006.
	Sweden and Denmark	Banned	Banned since 1989 and 2000 respectively.
	US	Permitted	but from January 2017, it has been illegal to use medically important antibiotics for production purposes.
	Canada	Permitted	Antibiotics may be imported to Canada in large quantities for 'own use' without any regulatory oversight by producers. Many antimicrobials important to treat humans are freely available in this way without veterinary oversight.
	Brazil	Permitted	Antibiotic growth promoters (AGPs) are commonly used on pig farms
Ractopamine (feed additive to promote leanness)	UK and rest of EU	Banned	since 1996. EU also bans imports from certain countries where ractopamine is used.
	US, Canada and Brazil	Approved	For use as a feed additive in pigs. Canada has a mechanism certifying that pork exports originate from pigs that have never been fed and/or exposed to ractopamine.
Castration	EU	Permitted	Must be performed by a trained person and, after seven days, anaesthetic or painkillers must be used and it may only be done by a vet. There is a voluntary agreement that surgical castration should be phased out altogether from 2018.
	UK	not permitted under Red Tractor	so just 2% of male pigs are castrated. This compares with Sweden (94%), Denmark (95%), Netherlands (20%), Germany (80%) and Spain (20%).
	US, Canada and Brazil	legally permissible	In the US and Brazil, there are no laws around when it should be done or the use of anaesthetic or pain killers. In Canada, a code of practice covers timing and pain relief.
Tail docking	EU	legally permissible	to dock a part of the tail where there is evidence of tail-biting. Other measures must be taken to prevent

			tail-biting before docking is performed. Must be carried out by either a vet or trained person. There are slightly different rules in Denmark and tail-docking is banned in Sweden.
	UK		The Real Welfare report estimated 70% of UK pigs have their tails docked. This compares with virtually all pigs in Denmark, Holland and Germany and 92% in Spain
	US, Canada and Brazil	Legally permissible	There are recommendations in the US and Canada about how it should be done.

Comparing EU welfare labelling schemes:

The **UK** does not have a single tiered welfare scheme, although there is natural differentiation, notably through Red Tractor, RSPCA Assured and Soil Association (organic). The various UK production systems – conventional indoor, outdoor-bred, outdoor-reared, free-range and organic – also create differentiation.

The **Danish** Product Standard outlines requirements for pig production under the DANISH logo. Its main focus is animal welfare, meat safety and traceability. Expected to launch this summer, Bedre Dyrevelfaerd (Better Animal Welfare) is a voluntary Danish Government tiered welfare labelling scheme developed in conjunction with the industry. It has three levels, indicated by one, two, or three hearts. There are no subsidies – the scheme is market-driven.

Beter Leven (Better Life) is a seal awarded by the **Dutch** Society for the Protection of Animals to farms, butchers, and meat processors that meet certain animal welfare criteria. Similarly, there are three levels to the scheme, depicted by one, two or three stars. Slaughterhouses pay farmers according to the star level in the hope they will get a premium back from the retailers.

Initiative Tierwohl, funded by participating food retailers in **Germany**, covers 27% of total pigs slaughtered each year. Payments of €0.04/kg of pigmeat are made to producers who implement basic requirements, such as antibiotic and welfare recording and annual ventilation and air, and water quality checks. Additional payments are made for further optional criteria, such as 10-40% more space, group housing of sows from six days post-service, free-farrowing and minimum weaning age of 28 days.

See Table 16 below for a selection of the standards across the schemes in place in the UK, Denmark and the Netherlands.

Table 16 Welfare labelling scheme requirements⁴⁹

Welfare item	UK Red tractor	UK- RSPCA Assured	Danish standard	Danish *	Danish ***	NL conventional	NL *	NL ***
No tail docking	X	Permitted in exceptional cases	X	V	V	X	X	V
No surgical castration	V	V	X	X	X	X		X
Loose-housed sows	V	V	X	V	V	X stalls permitted for four days post-service	X stalls permitted for four days post-service	X stalls permitted for four days post-service
Free-Farrowing	X	V	X	V Farrowing crate for up to 4 days after farrowing	V	X	X	V Farrowing crate for up to 3 days after farrowing
Space allowance (finishers)	Minimum legislation	+10-20%	Minimum legislation	More than minimum but areas not set	+100%	+20%	+50%	+100%
Weaning age	Min 21 days if moved to hygienic housing	Min 21 days if moved to hygienic housing	Min 21 days if moved to hygienic housing	Min 21 days if moved to hygienic housing	28 days	Min 21 days if moved to hygienic housing	Minimum 23 days	Minimum 42 days
Bedded lying area (finishers)	X	V	X	X	V	X	X	X

(Agrivalue SA based on Pig World editor Alistair Driver)

5.3 Food safety

5.3.1 European Union

The European Union's policy on food safety covers all stages of production. European manufacturers have been working on the idea of "Farm to Table" for years. In the case of pig farming, this means that it is possible to trace the rearing and slaughtering conditions of the individual animal - such as the farm, the origin of the feed, possible diseases, the place and date of slaughter.

This information is collected and stored thanks to the EU system of animal labelling (e.g. ear tags), which ensures the supervision of animal production in EU countries. Similarly, it is possible to trace the production and the origin of meat and meat preparations. Thanks to this integrated approach, the whole route of pork and meat preparations is monitored in the European Union and consumers are provided with accurate information on the origin of the products they consume.

⁴⁹ Alistair Driver editor of LBM titles Pig World and Farm Business and group editor of Agronomist and Arable Farmer (June 2017)

The entire production chain of high-quality pork is subject to EU food law and regular official controls. The idea of the "Farm to Table" slogan assumes the joint responsibility of producers, processors and distributors for food placed on the market.

5.3.2 USA⁵⁰

President Donald Trump's administration plans to give more authority to the pork industry, allowing them to conduct their own food safety inspections as early as May 2019, this will cut the number of federal inspectors by about 40%, replacing them with pork industry employees.

If the new inspection system goes into effect, pork plant workers—who's training will be up to their employer—will be tasked with identifying diseased and contaminated pork. Under the new system, no slaughter line speed limits would be required. Currently, line speeds are capped at 1.106 hogs per hour, or 18 hogs per minute.

Former USDA chief veterinarian Pat Basu expressed concerns about this new pork inspection system, refusing to sign off on it because he had concerns about consumer and livestock safety. In his professional opinion, making plant workers responsible for identifying and removing diseased hogs would be a mistake, and that trained USDA veterinarians were the only people who could do the job properly and effectively. Just a week after Basu left the agency in 2018, the proposal for the new inspection system was resubmitted to the Federal Register and published soon thereafter.

USDA and the pork industry support the implementation of a new inspection system, believing that it will free up more time to identify disease and contamination in their hogs. They would be able to focus on preventing contamination, as opposed to reacting to it after it has already occurred.

Another aspect of the new inspection system is that USDA would no longer test pork for Salmonella contamination. That would become the responsibility of plant owners, and their results would not have to be made public. Also, the plants will not be required to test for Escherchia coli, either.

Once in place, it is believed that pork plants policing their own food safety inspections will produce 90% of the pork produced in the U.S. The administration is also planning to implement the same changes within the beef industry. USDA officials are planning to discuss what that might look like next month.

5.4 The future of pork production

The future of pork production in the world is towards sustainable, welfare-positive systems. When talking about potential Dutch-Argentine cooperation within the field of pig production and processing it is definitely important to take into account the opportunities circular economy and its associated innovations may bring.

5.4.1 Circular economy "On the road with perspective"

In September 2018, the Dutch minister for Agriculture, Nature and Food Quality (LNV) Carola Schouten announced that circular agriculture will become her main policy goal. Circular agriculture, also known as low external input farming, is the model of the future.

In September 2019 she presented her realization plan with her vision upon a sustainable and strong agriculture in 2030. In the realization plan "On the road with perspective" that was established in

⁵⁰ Food Safety Magazine (April 2019)

close cooperation with farmers and other parties explains how the Dutch movement towards circular agriculture has been initiated and is irreversible.

Minister Schouten announced that the goal should no longer be to produce as cheaply as possible, but to produce with the least possible loss of raw materials and careful management of soil, water and nature. That is the core of recycled agriculture.

The change only succeeds with the help and commitment of banks, retail, social organizations, consumers and of course the government and farmer himself.

The transition to a strong and sustainable agriculture is taking shape by adapting laws and regulations to reduce the use of fertilizer and to promote animal manure. In order to be able to use (food) residual flows more often as animal feed, regulations are also being revised. For farmers who want to make their farm nature-inclusive but have insufficient land, Staatsbosbeheer makes land available.

- Financial resources

To realize circular agriculture, a large part of the LNV budget (135 million euros in 2019) goes to activities that contribute to the goals of this vision. Money for innovations is focused on this. There is also money available from the special envelopes of the Coalition Agreement, such as those for the warm remediation of pig farming (200 million euros) and for improving nature and water quality (40 million euros). For innovations that are compatible with cycle farming and climate-proof agriculture, € 25 million is already available in 2020.

- Experimental areas

Farmers who want to make the switch to recycled agriculture sometimes run into tight laws and regulations. In order to give innovation a major boost, the minister will initially give farmers in five areas room to deviate temporarily from provisions in legislation and regulations. There will be experiments related to closing cycles, manure and new crops), soil and water quality, precision agriculture, soil quality and nature-inclusive agriculture, vital countryside). The national government and the region are going to explore with entrepreneurs how new, more far-reaching steps can be taken on the road to circular agriculture.

- From fertilizer to animal manure

The feed-manure cycle in the Netherlands is not closed. The aim is to fertilize pastures, arable land and horticulture with high-quality fertilizers, including more locally available residual flows, compost or animal manure. Fertilizer use will be discouraged. The contours of the fundamental revision of the manure policy will become clear in the autumn. It is crucial to recover nutrients from animal and human faeces and to make good use of them. In a European context, the Netherlands argues for using high-quality fertilizers as a substitute for fertilizer. The Ministry supports pilot projects into the effects of this on agriculture and the environment.

- Make full use of residual flows

Most animal feed now consists of residual products from the food industry and raw materials directly produced as animal feed such as grains, maize and roughage - from all over the world. The minister wants to increase the share of residual flows as a raw material for animal feed. A special "Residual Team" will start this summer to help entrepreneurs make a start on this. In the spring of 2020, agreements must be made with the business community to recover all residual non-human products

from food production and food consumption reuse. For animal feed, or as fertilizer for vegetable production. Preconditions are of course the (food) safety and economic feasibility.

- Soil and innovation

In 2020 there will be a baseline measurement of the status of agricultural soils in the Netherlands and clear measurement methods will be introduced to continue monitoring the state of the soils in the future. In September there is the first (and annually recurring) Bodemtop to, among other things, exchange knowledge.

With precision agriculture, technology can be used to determine exactly what the soil, crops or livestock need. The National Precision Agriculture Agenda is expected to be presented after the summer. It is being investigated how technology can help to fertilize grassland better, protect nests and fauna in grassland and how technology can contribute to better weed control.

- Farmer is looking for forest

Agricultural entrepreneurs sign a cooperation contract with Staatsbosbeheer, which makes it possible to use several thousand hectares of leasehold land that are released for farmers who want to develop into nature-inclusive business operations. These experiments provide knowledge and good examples that are shared with the sector. In total, around 40 agricultural companies will participate in the Nature Inclusive Agriculture program.

- Strong position of the farmer condition

To make the transition to circular agriculture, the position of the farmer is crucial: he or she must receive sufficient appreciation and income to earn back the necessary investments. There are initiatives to improve the earning capacity of farmers. A recommendation about the most important preconditions for the earning capacity of farmers when switching to circular agriculture will follow this year.

Access to investments is important, as is the reward for social services, such as agricultural nature and landscape management. The business acquisition fund for young farmers creates financial space to invest in sustainable business development at the time of and immediately after business transfer.

Preventing unfair commercial practices is a condition. A number of unfair commercial practices are therefore prohibited by law and the Netherlands Authority for Consumers and Markets (ACM) will monitor compliance with these legal provisions and investigate via a special monitor how the pricing in the chain from producer to consumer takes place. There will also be a disputes committee where farmers can go for low-threshold and independent dispute resolution. The ACM ensures that farmers and horticulturists receive higher prices from buyers who set extra-legal requirements, for example with regard to sustainability or animal welfare.

5.4.2 Application circular economy in the pig sector

Taking into account the realization plan of Minister Schouten Dutch actors within the pig chain that believe in a sustainable way of producing can do so throughout their operations:

- Produce electricity through biogas installations

Biogas is extracted from manure, grains, corn and residual products from, for example, the animal feed industry and horticulture. The pig manure and the residual products come together in the so-called 'digester'. Gas is released during fermentation. This gas is then converted into heat and electricity for the company involved. An additional advantage is that one can dry its grains with it.

We return the surplus electricity to the energy supplier. The nutritious digestate - the residual product of the fermentation process - is spread out onto the land or dried away. The digestate has the advantage that it smells less and is a more homogeneous product for the plants in the field.

- feed supply

The Netherlands is re-known for the optimal use of side-streams from the human food industry. The country reuses residues from the production of potatoes and beer to produce high-quality proteins, or pork.

- State-of-the-art conditioning of pig housing

Conditioning the air in pig houses offers benefits for the pig farmer, the pigs and the environment. There are many techniques available that ensure less ammonia and odour, but that do nothing about the climate in the stable.

The four techniques are PAD cooling, heat and cold storage (WKO), heat recovery and recirculation of air.

Heat-cold storage (WKO) and PAD cooling ensure a better climate in the stables, so that animals grow better. WKO (short for heat and cold storage) is a method for storing energy in the form of geothermal heat or cold in the soil. A constant stable climate (air conditioning for pigs) is created, which has a positive effect on the welfare and health of the pigs. Sows are healthier, so that fertility and the number of piglets per litter remain optimal. The working climate is also improving, and the emission of substances is decreasing. A real win-win situation.

- Solar energy

Pigfarms have important roof surfaces which can be used to install solar panels to create energy production. With solar panels farmers can produce electricity for their own company and for third parties.

Agriculture - Pigs and arable farming are inextricably linked. Agricultural land must be fertilized, and pigs produce that manure. Arable farming is an important branch for pig farmers. By growing their own grains and corn, they can create their own pig feed for their animals.

5.5 Regulatory Framework

The global and regional regulations governing the sector are presented in table 17. For specific information about the Argentine regulations please look at chapter 6.3.

Table 17 Overview of regulations governing the sector:

Regulatory entity	Website
European Union	http://eur-lex.europa.eu
FDA	https://www.fda.gov
World Trade Organisation	https://www.wto.org
OMS	http://www.who.int
CODEX Alimentarius	http://www.fao.org
MERCOSUR	http://www.mercosur.int
ANVISA – BRASIL	http://portal.anvisa.gov.br

(Source: Agrivalue SA)

6 THE ARGENTINE PIG SECTOR

6.1 Overview of the Argentine pig sector

The total value of the Argentine primary pig production sector is U\$S 735 million dollar and the gross value of industrial production is U\$S 2.625 million dollar⁵¹. The gross added value of the total pig chain reaches U\$S 2.101 million dollar. Comparing with other economic sectors in Argentina the pig chain is similar in size to the basic metal industries and exceeds the wine, soft drinks and furniture manufacturing sectors.

Argentina has great potential for pig production, but still it has been a relatively small player. With 2.8 million km² the country has a relatively low population density, is free from various diseases and even has the status 'free from Foot and Mouth Disease' with the World Health Organisation (WHO).

The Argentine pig production sector has always been characterised by being a secondary activity of agricultural operations in general in hands of small farmers. Consequently, national productivity figures always have been way below the levels reached by the main pig producing countries such as the United States, Germany, Denmark and The Netherlands. In the past the local market as well could be considered as instable, as internal consumption did not reach more than 7 kg per person until 1999, of which only 1 kg fresh pork.

The end of the period of convertibility in Argentina (1 USD was equal to 1 ARG peso) resulted in a considerable improvement of the competitive position of the Argentine pig sector. Import values increased, the profitability of the local primary production sector improved, resulting in an increase in production, with a tendency to replace imports for local production.

Thanks to the incorporation of modern technology the local farmers succeeded to intensify production and introduce modern improved genetics and the feed formulas increased resulting in an improved feed conversion and productivity, as well as the quality of production and end-product.

Currently Argentine professional production levels are comparable to those of leading pig producing countries but there are pending issues to solve such as lowering the use of antibiotics, a better management of effluents and a proper consideration of animal welfare.⁵²

In approximate terms, it is estimated that 45% of the production expansion observed in the last 10 to 12 years would respond to the greater endowment of sows (particularly in medium and high-scale farms), another 45% to productivity improvements (increase in live piglets destined for fattening per sow per year) and a remaining 10% to the increase of weight of the slaughtered animals.

With respect to the factors that explain the productivity jump, two of them stand out: the technological change (great "modernization" of the farms) and the growth of the average scale. A third factor also contributed, the greater efficiency in the integral management of the establishments (specialization and greater integration of the actors in the chain).

As image 8 shows the Argentine pork chain and its derived products have two productive stages:

Primary production:

Responsible of the production of the standing animal and the transformation of vegetable protein into animal protein.

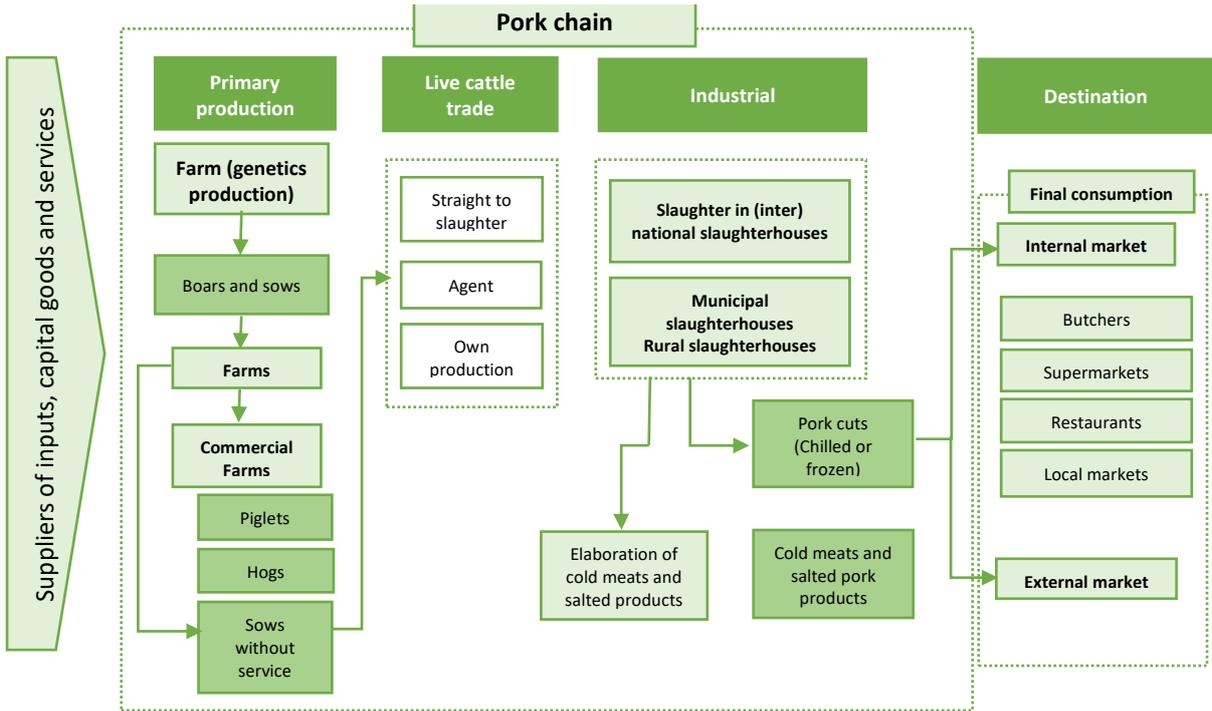
⁵¹ Centro de Información de actividades porcinas (CIAP) 2018

⁵² Jorge Brunori pig expert at the Agriculture Technology Institute (INTA).

Industrial production: In charge of transforming pig into meat and finished product. This stage differentiates two subactivities, the slaughter of pigs and the production of fresh or frozen meat, and on the other, the transformation of meat in sausages, canned and salted meats. Often these are carried out by the same company in contiguous buildings:

- pig slaughter and production of chilled/ frozen fresh meat
- transformation of meat into sausages, canned and salted products (bacon, hams, bondiola, bacon, etc.) offal is also obtained (livers and other), visceras (calibrated and others) and by-products (flour, oil and pork fat).⁵³

Image 8 Argentine pork production chain



(Source: Agrivalve SA)

During the last 15 years the Argentine pig sector has shown large expansion, mainly focused on the domestic market. Over the past seven years Argentina even doubled its pork production from 280.000 to 565.000 metric tons due to growing domestic consumption. Despite this expansion, production is still insufficient to meet national demand and the country still imports from Brazil.

The main challenge of Argentina is to become self-sufficient and become a trustworthy supplier of other countries. Exports are already starting to play a bigger role, increasing 53% over the first four months of the year 2019⁵⁴. Up to 70% of argentinnes current pork exports now go to Russia.

Table 18 Indicators of the Argentina Pork Market (2018)⁵⁵

Activity	Quantity	Unit
Primary production operations	4.900	Farms
Sow herd	361.227	Head
Slaughtered	6.778.976	Head
Production	620.549	Metric tons carcass weight

⁵³ https://www.economia.gob.ar/peconomica/docs/SSPE_Cadena_Valor_Porcina.pdf

⁵⁴ Magyp 2019

⁵⁵ Secretaría de Agroindustria - Evolución Mensual y anual de los indicadores Argentina 2018

Import	45.154	Metric tons
Import	123.954	Thousand US\$
Export	23.228	Metric Tons
Export	38.940	Thousand US\$
Consumption	660.513	Metric Tons
Consumption per capita	14,84	Kg. / inhab. / year

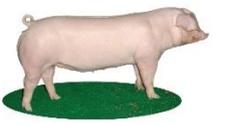
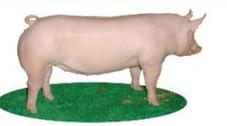
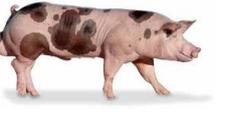
(Source: Agrivalue SA based on AAPP, GITEP, Argenpork, MINAP and INDEC)

The following paragraphs will give insight in each link of the Argentine pig production chain.

6.2 Pig Genetics

The most used genetics in Argentine hatcheries are based on hybrids generated from the cross between Yorkshire and Landrace, although Duroc Jersey and other breeds also intervene. These genetics seeks prolificity and good breeding in sows and rapid growth and lean meat in breeding and termination. An overview of the pig breeds that are exploited in Argentina are shown in table 19.

Table 19 Pig breeds in Argentina

Pig Breed		Description
Duroc Jersey		Rustic and adaptable breed, mainly from the USA. They are red ranging from yellowish red to dark red. Its ears are medium sized slightly erect at its base with a forward tilt.
Hampshire		They are black with a white stripe that surrounds the body and encompassing anterior limbs. It has ears of the asian type. They are rustic animals but less resistant to heat. Very prolific, they have excellent milk and maternal aptitude.
Landrace		Race of european origin. It has a white coloration with ears of the same color, directed entirely forward. They are the longest of all races. Very prolific, with piglets with very good birth weight. Its most appropriate form of breeding is intensive.
Spotted Poland		Race of american origin; bodycolor 50% white and the same with black spots. One of both colors may predominate up to 80% maximum. It is characterized by having good bone structure, although some weakness in its poise. Good rusticity and dairy aptitude. It is raised (semi-)extensively.
Yorkshire		Race native to england. Its body is long, wide and deep with a solid appearance. They are totally white, without spots with erect ears. It has good rusticity; its character is prolific and good dairy and maternal aptitude.
Pietrain		Over-black race of belgian origin, with ears of asian type. Due to its abundant muscles and low fat, it is one of the breeds used to produce lines of sows destined to produce hybrid pigs

(Source: Agrivalue based on AACPorcinos, ABC del Finkeros, Pork Org)

The main pig genetic suppliers in the market are Agroceres PIC, Topigs Norvin, Hypor, Choice genetics and former Genetica Austral. For more information about these companies please see Chapter 8 Stakeholders.

6.3 Feed supply

Argentina is the only country in the world that exports about 60% of the feed grains it produces and 90% of soybeans (source of energy and protein, respectively). In 2017 the total Argentine feed demand reached 20.8 million Mt an increase of almost 30% compared to 2012, while local pig feed demand increased almost 50% to 2.8 million metric tons⁵⁶.

In 2018 according to the Alltech Global Balanced Food Survey 2019 (data from 144 countries and almost 30.000 feed mills) total global feed production increased with 3% reaching 1.103 million metric tons. For the third consecutive year feed production has exceeded 1.000 million metric tons. Argentina has an outstanding participation by exhibiting a 4% expansion in its production volume with respect to the previous year remaining third in the Latin American ranking of manufacturers.

The animal feed industry experienced a growth of 14.6% in the last five years, which is equivalent to an annual average of 2,76%. As the population grows, the middle class also increases, and an increase in total protein consumption is reflected.

Brazil continued to lead the production of compound feed for the region and is the third worldwide. Together with Brazil, Mexico and Argentina continue to produce most of the compound feed in Latin America, with 76% of regional production. Brazil remained stable, while Mexico and Argentina registered a growth of 1% and 4%, respectively.

Table 20 Feed demand in Argentina (2012-2017)⁵⁷

Species	2012	2016	2017 (estimate)
Beef cattle	2.615.623	6.161.000	5.037.803
Dairy cattle	3.346.981		5.557.649
Broilers	4.590.303	6.738.000	5.439.414
Laying hens	1.848.133		1.829.380
Pigs	1.464.588	2.366.000	2.780.859
Rabbits	34.000		
Equines	8.023	7.000	94.788
Sheep			44.532
Aquaculture	4.000	7.000	4.200
Others	675.050		
Total	14.586.050	16.577.000(*)	20.788.626

(Source: Agrivalue SA based on CAENA 2018) (*) Estimates

The Argentine Chamber of Feed factories (CAENA) calculates an existence of 382.000 sows, a slaughter volume of 6.4 million pigs and a production of 566.276 metric tons of meat with bones. The average feed conversion rate for fattening pigs accepted by the industry is 3.1. Total annual feed consumption per sow is estimated at 1.200 kg per year. In 2016 the Ministry of Agribusiness estimated an average conversion factor of 3.1 of feed to pork, while the adjusted coefficient reaches 3.7. If 60% of the diet of pigs in Argentina contains corn, in 2018 the consumption of corn by the pig sector would have reached 1.3 million tons compared to 1.25 million in 2017.

Products intended for animal feed must be registered with SENASA. In order to produce animal feed, the producer has to enable his plant and register the company at SENASA.

⁵⁶ CAENA (2018)

⁵⁷ CAENA (2018)

6.4 Health status and health management

In Argentina the National Health Service and Agrifood Quality (SENASA) is in charge to prevent, eradicate and control diseases of animals that can affect agricultural production of the country; and verify the safety of the food.

Argentina has a situation of global privilege in terms of health status that the country has built for many years, due to isolation (little exchange of inputs and products); the good control work by SENASA and the country's unique production conditions due to the low density of pig establishments.

The application of adequate biosecurity measures plays a fundamental role to reduce the risk of disease entry to the farm and, in turn, to prevent its dissemination. Preventive actions of diseases entering the country are based on controls in borders, development and updating of animal health requirements on imported products, and activities of training and sensitization to producers and professionals, among others.

SENASA prepared a manual "Biosecurity in pig farms"⁵⁸ with the objective to describe the fundamental management measures to apply to prevent the introduction and transmission of infectious diseases to an establishment of pig farming.

In 2017, Argentina submitted all the respective documentation to the World Organization for Animal Health so that the country can be officially declared free of Classical Swine Plague (PPC).

As the industry is growing, mainly in the last ten years, the productive models that do not look at and take care of their biosafety become a risk for the rest of the chain, with the potential risk to seriously injure the pig production of excellence.

Argentina is already taking the set of physical and management measures designed to reduce the risk of introduction, establishment and spread of pathogens to, from and within the pig production sector and as such assure its biosecurity.

Within the modern production facilities these measures are already implemented, but according to the scale and type of production improvements can be made. Farm owners and veterinarians are the ones designing the animal health plan and then include the operators, who have the task of carrying it out day by day.

6.4.1 Pharmaceuticals

The total value of the veterinarian pork sector was estimated between 14 and 24 million US dollar⁵⁹. There are more than 100 veterinarians active in the sector and an undefined number of veterinarians that are operating as consultants for companies in the local pig sector. In chapter 8 an overview of the main pharmaceutical companies is presented.

⁵⁸ http://www.SENASA.gob.ar/sites/default/files/manual_cerdos-mod.pdf

⁵⁹ Motivar - Pig Production in Argentina (2017)

6.5 Animal welfare⁶⁰

SENASA is in charge of the Animal Welfare Program, within the Dirección de Luchas Sanitarias (Bureau of Animal Health Control) in the Animal Health Area. SENASA Resolutions 253/2002 and 259/2004 created the Comisión Nacional Asesora de Bienestar Animal (National Consultancy Committee for Animal Welfare) and the Coordinación de Bienestar Animal (Animal Welfare Coordination) to promote and implement animal welfare practices in all livestock production. The Manual of Good Practices in Bovine Production and the Manual of Good Practices in Transportation have been created within this Program.

According to the definition in the Inspection Regulation of Products, By-Products and Derivatives of Animal Origin (Decree No. 4238/1968), in its chapter XXXII: "Animal Welfare is understood by the state in which the animal needs are met in relation to habitat, so as not to affect the physical and behavioural integrity of animals. They must then find guaranteed adequate accommodation, responsible treatment and humanitarian sacrifice." And it is in this sense that the Inspection Service of SENASA evaluates its compliance in the transport of animals, and in the accommodation in the slaughterhouses.

A non-governmental organization involved in Agricultural Research and Development and animal welfare is FIDA, previously called FADA (Animal Foundation for Animal Welfare), a non-profit organisation dedicated to health care, educational and legislative activities to elevate the quality of life of animals, and therefore of people.

FABA promotes observance of specifications that guarantee animal welfare, considering the quality of feed, the environment, the facilities, the handling and compassionate treatment of animals, as deemed adequate for each species and productive characteristics. The Foundation is a member of the Global Task Force, Eurogroup, Brussels 2004/2005 and a Member of the Coordinating Committee on Animal Welfare.

6.6 Animal identification⁶¹

In July 2019 the Argentine Government published a public consultation on a SENASA project for the creation of a National Electronic Identification System for Bovines, Water Buffalo, Cervids, Sheep, Goats and Swine.

The initiative is for all agricultural producers who breed, receive or winter these species and who wish to use electronic identification devices with official recognition as an animal identification method for current identification systems.

In all cases of official use, the button-type tag device (male-female) placed on the right ear of bovines, bubalinos, cervids will be mandatory. This device may be complemented with the corresponding card-type tag (male-female) of the visual type placed in the left ear of bovines, bubalinos, cervids, according to SENASA Resolution No. 257/2017.

In the case of bovines, bubalinos, deer whose establishments are in the FMD free zone without vaccination, both types of devices will be mandatory, the electronic button-visual card binomial, according to SENASA Resolution No. 257/2017".

⁶⁰ https://www.argentina.gob.ar/sites/default/files/manual_de_bienestar_animal_especies_domesticas_-_SENASA_-_version_1-2015.pdf

⁶¹ La Nación (July 2019) SENASA project: electronic tag for livestock argentina

This electronic identification system project was generated at the request of producers, because there are already many who use an electronic identification system. It seeks to homologate the SENASA caravan contemplated in resolution 257-E / 2017, which can be both electronic and manual, so you do not have to put two tags. In such a way those who use an electronic tag, when the new regulations come out, will be able to ask for the official one but instead of manual, electronic. The benefits are productive and individual. It is a matter of handling, of speed, for example for those who export to the European Union, who must register all the numbers of tags and certificates.

The only market that asks for traceability through electronic tag is the European Union, but it is undeniable that it generates confidence not only in the consumer but also in the buyer, which makes the system certification much easier and not only as something of control, but to certify from end to end how is this process.

SENASA idea is to go with the entire production system towards a traceability and an individual electronic identification to somehow guarantee to the consumer, both Argentine and worldwide, the quality and safety of what comes to their tables.

6.7 Import regulations

6.7.1 Import live animals and reproductive material

With the objective of genetic improvement of its livestock production, the Argentine Republic annually imports animals and reproductive material that, to enter the country, must meet a series of sanitary requirements demanded by the National Service of Health and Food Quality (SENASA). These sanitary requirements for the importation into Argentina of live animals and reproductive material for the production, companion and wild species are available on the SENASA website <http://www.SENASA.gob.ar/node/14565>⁶² MERCOSUR/GMC/RES. N° 07/17 Requirements for the import of frozen swine semen.

Among other requirements, they detail the sanitary condition of the exporting country, the duration of the quarantine at source and the diagnostic tests that must be met in the exporting country before arriving in the Argentine Republic.

This SENASA digital consultation channel allows users to have up-to-date information for their commercial transactions while being an open and accessible source of information for foreign commercial operators and veterinary services in other countries.

In this way, SENASA streamlines, facilitates and makes the process of opening markets for the importation of animal goods transparent within the framework of transparency commitments made internationally by the Argentine Republic.

The annual import of more than 4 thousand pigs, horses, cattle, sheep and goats, among others, and genetic material - semen and bovine embryos mainly - generate a positive impact on national production and favor the agro-food export profile of Argentina.

6.7.2 Import of fresh or frozen pork and pork products and salted natural pig casings

In compliance with Decree 4238/68 – “Regulations for the Inspection of Animal Products, By-Products, and Derivatives Related to the approval of Animal Products, By-products, and Derivatives that are Manufactured or Used in Approved Establishments,” all food products imported into

⁶² SENASA September 2018

Argentina must be registered with Argentina’s National Food Safety and Quality Service, El Servicio Nacional de Sanidad y Calidad Agroalimentaria (SENASA).

Argentina, like Brazil and Uruguay, requires plants, products and labels to be registered with the importing country before any product can be exported. This can be a complicated process because the labels for Argentina must be registered by the importer, requiring a somewhat defined exporter/importer relationship to occur before commercial pricing/shipping discussions can even commence.

An example of this situation is the import to Argentina of USA pork. It took USDA and the Argentine veterinary authority some time to sort out the U.S. registration process, which allows for U.S. exporters to register their plants and products without an importer. However, even though the registration process has been defined for U.S. pork, exporters are just now working through the process to get labels registered. This, along with economic factors in Argentina, has resulted in no commercial shipments of U.S. pork, even though the market has been open for more than a year. However, the USMEF sees opportunities in Argentina, as the United States will be one of the few eligible bone-in suppliers for the market.⁶³

For imported products, each product must be registered with SENASA prior to its initial entry to Argentina through an industry-provided monograph. Subsequent imports of the same company product do not require additional registration for import by different importers. SENASA will provide a unique registration number based on the descriptive aspects of the product to the importer.

Following the initial product registration, Argentine importer(s) may apply for an import permit license from SENASA only for products registered under the company’s monograph. Prior to entry, exporters must also submit product labels to SENASA for pre-approval. SENASA will communicate with the Argentine importer about the approval status of the label. The label must be present on the product prior to domestic distribution in Argentina. SENASA may also require some additional product information not provided through the monograph, FSIS Forms 9060-5 or 9060-7 and/or Letterhead Certificate but which may be provided at commercial level through various documentary resources.

6.8 Regulatory framework

Table 21 Catalogue of regulations governing the sector:

Regulatory entity	Website
Argentine Codex	http://www.anmat.gov.ar/
Senasa	http://www.senasa.gob.ar/
Conal	http://www.conal.gob.ar/
Ruca	https://ruca.magyp.gob.ar/
Mercosur	http://www.mercosur.int/
FAO Codex	http://www.fao.org/
Anvisa	http://portal.anvisa.gov.br/
European Union	http://eur-lex.europa.eu/
FDA USA Food and Drug Administration	https://www.fda.gov/
World Trade Organisation	https://www.wto.org/
World Health Organisation	http://www.who.int/about/es/

(Source: Agrivalue SA)

⁶³ <https://www.nationalhogfarmer.com/marketing/pork-export-channels-rely-education-overcome-challenges>

6.9 Primary production

In 2018 almost five thousand pig farms registered at SENASA with a total stock of 361.227 sows. Only 46 of these productive units are large scale operations with more than 1.000 sows. The total number of slaughtered pigs on an annual basis is more than 6.7 million heads.

6.9.1 Production systems

Argentina has the following productive systems: extensive, semi-intensive and intensive.

6.9.1.1 Extensive operations

Extensive operations are family productive units that have between 20 and 50 sows. Production activity is destined to own consumption and handmade elaboration of sausages and is complementary to other agricultural productions.

Generally, the facilities and infrastructure are made with iron plates and/or wood. The animals are placed in land pens. Feed is based on corn and/or low-cost by-products. Per litter the sow gets between 10 to 12 piglets, reaching a productivity of 1.000 to 1.200 kg meat per sow per year.

Most establishments are small in size (up to 50 sows), represent 96% of the total and own 46% of the total pigs.

6.9.1.2 Traditional improved (or mixed) operations

On average, these establishments have between 40 and 100 sows. Production is full cycle and there can be two types of production systems. In the first, all stages are performed on field; while in the second there is some degree of confinement in the stages of breeding and rearing and appropriate infrastructure (delivery shed, fattening tracks) is present.

In general, they have partially incorporated technology (balanced feeding, genetics, modular delivery and breeding equipment) and are managed with certain standards in production and health planning. Each sow gets between 12 to 14 piglets per year which gives a productivity of 1.200 to 1.600 kg per sow per year. Those of medium size (between 51 and 100 sows) represent 3% of the establishments and concentrate 14% of the heads.

6.9.1.3 Intensive operations

Intensive (concentrated) operations are companies that incorporated modern technology that carry out all (or the vast majority) of the activities in confinement. In general, they have more than 100 sows and produce in full cycle and / or fattening.

Improved genetic material is used, food rations are controlled and balanced, a health plan is carried out, they have technical assistance and they have optimal infrastructure at all stages. Marketing is done directly to refrigerators. The level of delivery is 16 to 20 pigs per sow per year, which implies a productivity of 1.600 to 2.000 kg meat per sow per year.

The latter has high productivity standards and, many times, tends towards vertical integration both forward and backward. The large ones (more than 100 sows) represent 1% of the total and have 40% of the total pigs.

The total amount of pigs in relation to the number of sows increases as the size of the establishments grows. This is due to greater efficiency due to better sanitary conditions, better feeding and better care of pigs, which results in lower mortality.

The minimum scale for establishments to be considered efficient is estimated at more than 60 sows, since it is considered that a rural worker can cover the care of this number of sows, which offers an annual volume of meat that allows direct costs to be covered, including the staff, and also grants some final profitability, even considering the land factor.⁶⁴

6.9.2 Size of pig production establishments

Although the Argentine pig sector is highly concentrated there is great heterogeneity within the Argentine primary production level. Small producers with fewer than 10 sows in production coexist with commercial farms with more than 500 sows up to 12.000 sows.

Most of Argentine pig producers have very low-scale production systems (72% of the total, about 3.500 farms in 2018). Of the total of almost five thousand pig farms registered in SENASA in 2018 only 28% of the production units counted for 93.4% of the national pork production.

Image 9 Pig production concentration (2018)

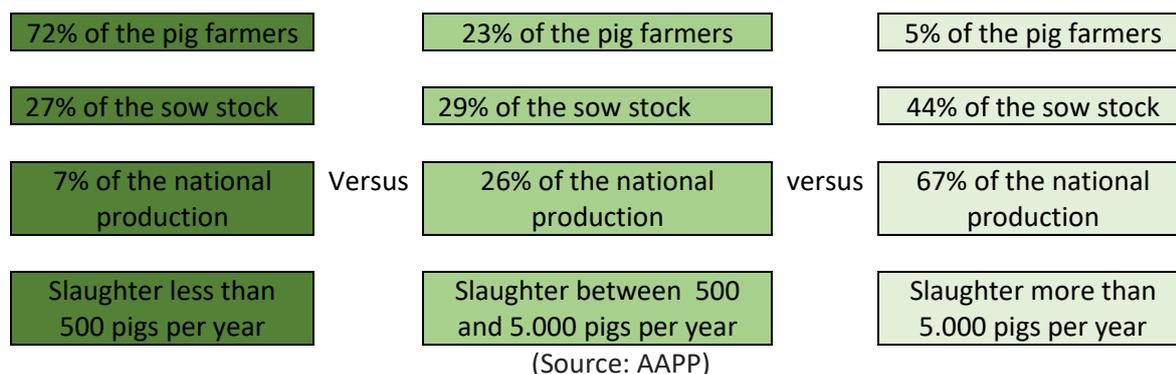


Table 22 Participation by ranking of sow herds 2018

Range of sow herd	Number of companies	%	Number of Sows	%	Slaughter quantity (heads)	%
0	464	9%	-	-	849.527	12,5%
1 – 10	813	16%	4.913	1%	153.453	2,3%
11 – 50	2.303	46%	63.743	18%	586.356	8,7%
51 – 100	839	17%	59.364	16%	680.947	10,1%
101 – 250	298	6%	47.841	13%	783.775	11,6%
251 – 500	137	3%	48.196	13%	913.443	13,5%
501 – 1.000	63	1%	42.795	12%	864.963	12,8%
>1.000	46	1%	94.375	26%	1.942.116	28,7%
Total	4.963		361.227		6.774.580	

(Source: Agrivalue SA based on data of MinAgri 2019)

According to the number of sows Argentine Pig producers can be classified five categories as presented in the table on the next page.

⁶⁴ Informes de cadenas de valor – Ministerio de haciendas y Finanzas Publicas

Table 23 Pig farm categories

Farm Size	Category description
Less than 10 sows	Subsistence production, for self-consumption and home production of cold cuts, generally for end-of-year festivities. Pig farming complements other agricultural and farm activities. Generally open field system and usage of family labour. These farms supplement their herds based on feed prices, have minimum health care plans and low levels of genetic improvement of their stocks.
Between 10 and 50 sows	Commercial breeding farms, generally extensive (pasture), which eventually confine the maternity stage. Predominantly family labour. They are often combined with other activities, such as agriculture.
Between 50 and 100 sows	Usually production both in the open air and in confinement. In general, these systems are characterised by the lack of business management.
More than 100 sows	Comprises all stages of the productive cycle and have advanced genetics, health care plans, feeding based on balanced feed, and good management practices.
More than 500 sows	Sophisticated and efficient breeding farms that comprise all the stages of the productive cycle and have advanced genetics, health care plans, feeding based on balanced feed, and good management practices.

(Source: Agrivalue SA based on GITEP, MINAG, Argenpork)

The small-scale producers sent less than 500 heads to slaughter per annum, which is equivalent to an average of 1.5 heads daily. These small-scale systems do not allow the incorporation of state-of-the-art technology and more efficient systems, hinder the standardization of quality (meat), have a higher negotiation cost and higher tax informality. At the same time these producers are playing an important role both in the socio-economic support of families and in the supply of food to the regional markets.

The largest establishments operating more than 2.000 sows represent 11% of the total breeding establishments, own 57% of the total national sow stock (about 205.463 sows) and represent 81.1% of the total slaughterhouse supply (about 5.4 million heads). Table 24 shows the participation of the different sized pig operations by ranking of heads sent to slaughter:

Table 24 Participation by ranking of heads sent to slaughter 2018

Range of Heads to slaughter p/year	Number of companies	%	Number of Sows	%	Slaughter quantity (heads)	%
<50	1.371	28%	25.927	7%	29.945	0,4%
51 – 250	1.551	31%	45.125	12%	197.736	2,9%
251 – 500	625	13%	25.645	7%	223.236	3,3%
501 – 1000	499	10%	28.061	8%	346.510	5,1%
1001 – 2000	347	7%	31.006	9%	483.722	7,1%
2001 – 5000	309	6%	46.092	13%	946.687	14,0%
>5000	261	5%	159.371	44%	4.456.744	67,1%
Total	4.963		361.227		6.774.580	

(Source: Agrivalue based on MAGyP and AAPP data)

About 72% of the pig farmers, representing 27% of the sow stock, slaughter less than 500 heads per year, equal to 7% of the slaughter. Approximately 23% of the pig producers, keep 29% of the total national sow stock and slaughter between 500 and 5.000 heads per year, representing 26% of the slaughter. Only 5% of the producers, representing 44% of the stock of sows nationwide, send more than 5.000 heads per year to slaughter, representing 65% of the national slaughter.

6.9.3 Pig production regions

Pig production can be found all over Argentina, but most of the pig-meat production is found in the central region; in the north of the province of Buenos Aires, central Córdoba and in the south of Santa Fe province, all relatively close to the country’s capital Buenos Aires.

Approximately 82% of the total sow herd can be found in these areas and 90% of the total slaughter takes place here as the two maps below show.

Image 10 Sow stock per province

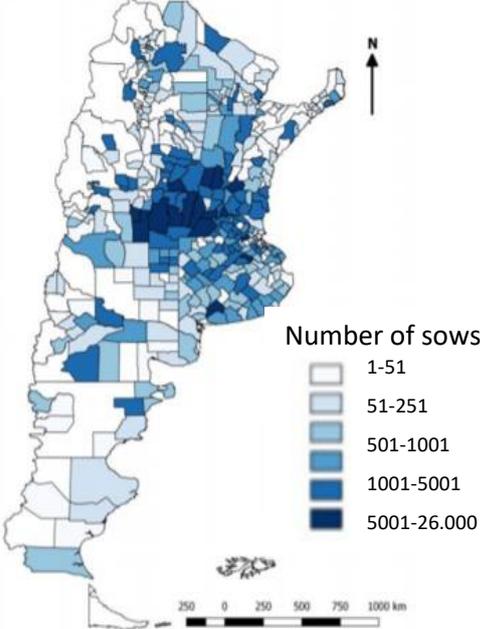


Image 11 Slaughter participation per province(%)⁶⁵

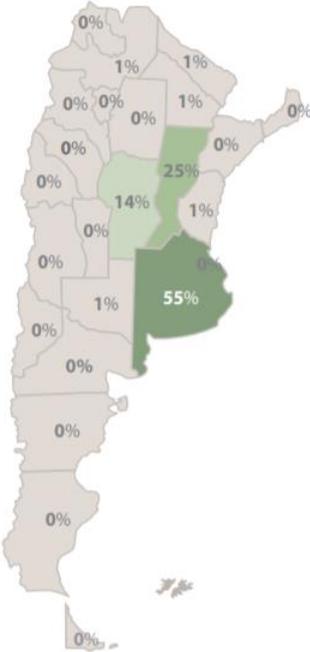
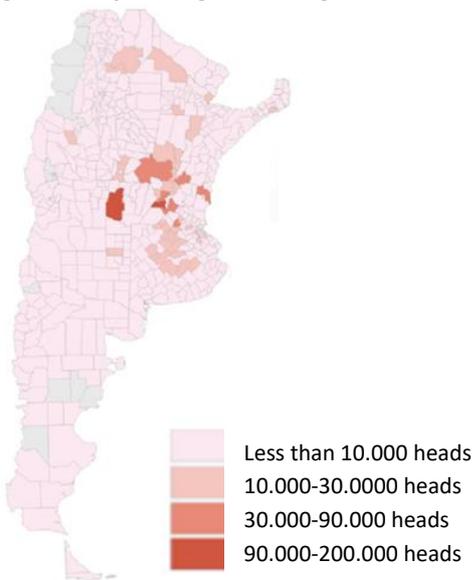
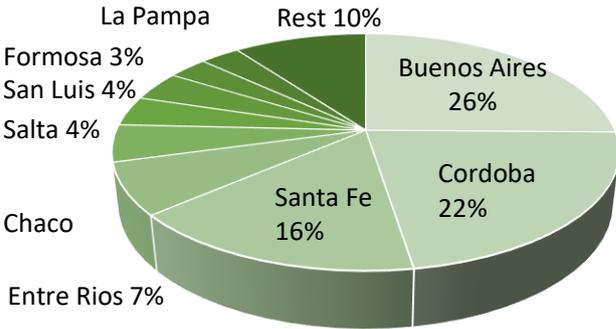


Image 12 Map of Argentine Pig herd distribution



Graph 26 Pig herd concentration



(Source: Coninagro and Magyp)

⁶⁵ Economic Area of CONINAGRO, Technical Report N°6 “Regional Economies – Pigs” (2018)

Breeding locations match the surfaces growing corn and the distribution of compound feed factories, one of the main inputs for primary production.⁶⁶

Between 9 and 19% of pig feed is based on soy. Soy represents 55% of the total agri-food chain exports of Argentina, followed at a distance by corn (10%), beef (6%), wheat (4%), grapes, dairy, peanuts, sorghum and forestry. These chains concentrate 90% of the total export.

In 2019 the corn production region is preparing to make a productive leap of 10% of the corn area by setting the highest planting scenario of the last 10 years. This would result in an increase in volume of around one million tons, going from 12 Mt of this year to produce 13 Mt.

Maiz Production per province (%)	
Province	%
Cordoba	38
Buenos Aires	31
Santa Fe	14
Entre Rios	5
La Pampa	3
Santiago de Estero	2
Chaco	2
San Luis, Salta, Tucuman	3
Other provinces	~1

(Source: MAGyP)

Image 13 Pig production chain participation ⁶⁷

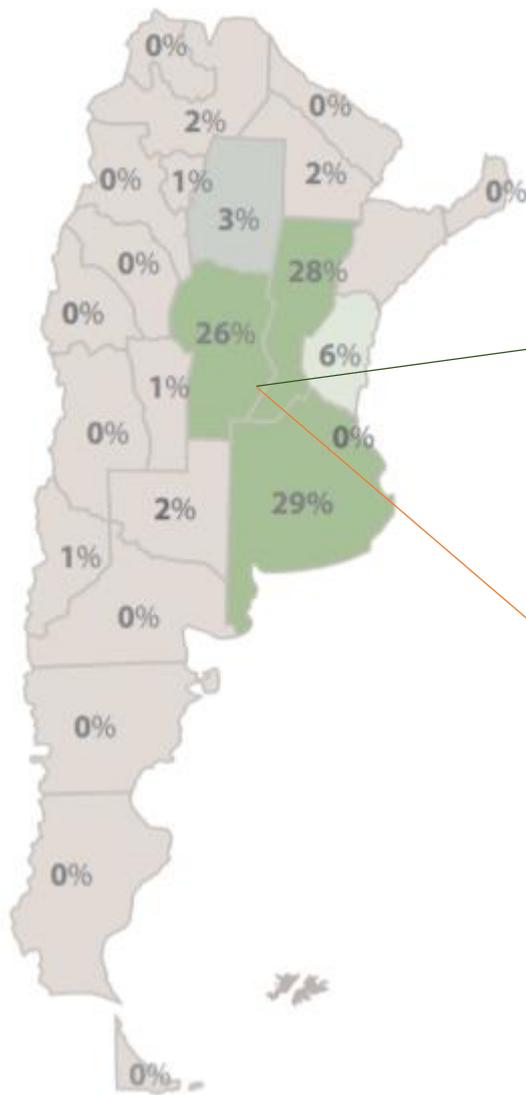


Image 14 Corn production regions (2018)

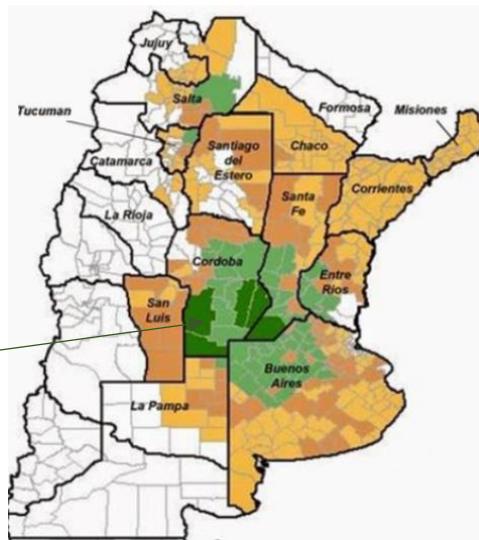
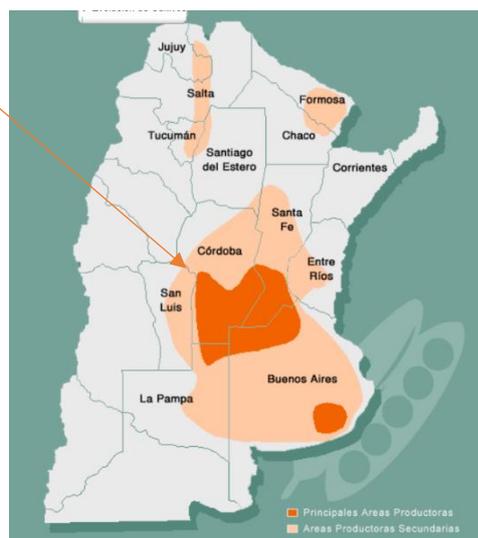


Image 15 Soy production regions (2018)



⁶⁶ <http://www.oecd.org>

⁶⁷ Economic Area of CONINAGRO, Technical Report N°6 “Regional Economies – Pigs” (2018)

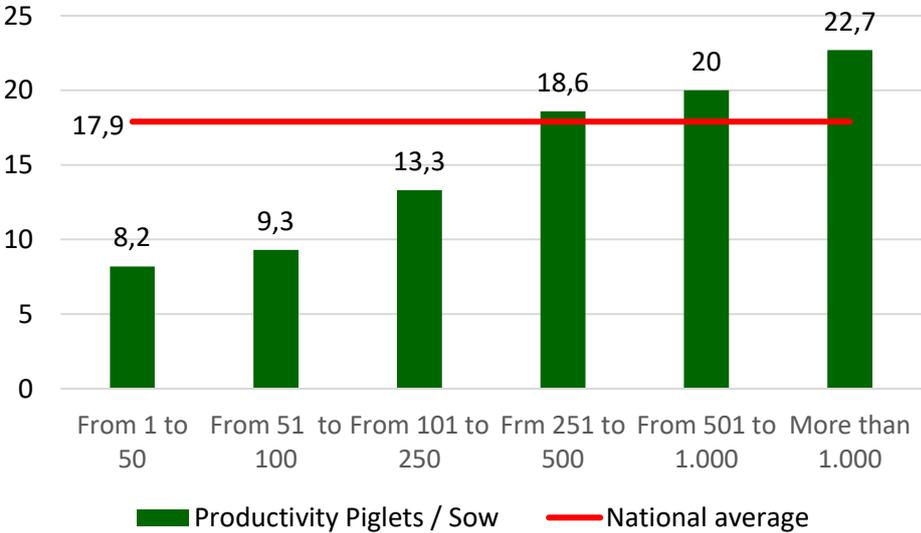
6.9.4 Productivity

One of the most frequent ways of measuring productivity in swine activity is the number of hogs that it produces in relation to the number of sows in stock (capons / sows / year). The average of Argentina is 17.9 heads sold / sow / year. As can be seen in the following graph, the amount of capon produced in each of the strata is different.

The total amount of hogs in relation to the number of sows increases as the size of the establishments grows. In this way, the stratum of less than 50 sows has a productivity of 8 heads sold per year, while from the stratum of 250 sows a productivity of 18 capons per sow is obtained.

The establishments of more than 500 sows achieve a productivity of 22 capons per sows, being above the national average. This higher productivity according to the size of the establishments, is related to greater efficiency due to better facilities and zootechnical indicators, due to the greater specificity achieved by having a larger size.⁶⁸

Graph 27 Average productivity according to sow farm size



(Source: Agrivalue SA based on GITEP, MAGyP)

The quality and slaughter performance of pigs from small farms is lower than those produced in large farms, besides health and fiscal controls on small farms are weak due to informality.

6.9.5 Environmental impact of pig farming in Argentina

As mentioned before in this document, the Argentine national pig production has been increasing significantly in recent years with the consequent increase not only in the number of farms but also in their size. The use of swine effluents as an organic fertilizer is a frequent practice in Argentina, and although it brings benefits to the crop yield as to the soil it is used without any estimation of their needs as well as of the environmental consequences that could derive from its inappropriate use.

The Argentine Ministry of Agriculture understands that management and use of alternatives must be operationally practical, economically viable and environmentally friendly, and that clear guidance needs to be given to producers as well as to state agencies in different jurisdictions. That is why they

⁶⁸ <https://infopork.com/2018/11/estructura-del-sector-primario-porcino-en-argentina/>

prepared document that allows them to conduct the issue in pursuit of leading a shift towards the valorization of effluents of animal origin and its responsible use.

The document “Good Management Practices and Use of Swine Effluents” prepared by the Argentine Ministry of Agribusiness (Presidency of the Nation) aims to address the problem of effluents from pig farms in Argentina and propose general guidelines for the dissemination and adoption of Good Management Practices and use of those. For more information please have a look at the following link: www.agroindustria.gob.ar/sitio/areas/prensa/folletos_digitales/contenido/Manual_Porcino.pdf

There are also other public-private initiatives such as for instance the 1st Provincial day of agricultural waste management and use of pig manure organized by INTA in cooperation with the environmental consulting firm for the agricultural sector and industry Ambientagro⁶⁹.

Another example is the investment of 5.8 million Argentine pesos in alternative energy through the generation of biogas by pig production farm El Cebil in 2018. The farm generates biogas for self-supply of energy.

The Cebil has 1.000 hectares (850 for agricultural use, with a rotation of 50% soybeans and 50% corn). The farm has 1.000 sows with a birth rate of 90% and 28 weaning; Their production is 3.1 million kilos per year in their own slaughter facility Calidad which is able to export (to Hong Kong e.g.)

The owner of the Cebil, Luis Picat, explained that two months after testing the system, the savings between gas and electricity reached 70%, in addition to having a sustainable solution for the treatment of effluents. The recovery of the investment will be in about five years⁷⁰. The biodigester receives about 90.000 liters of effluents per day (from the 1.000 sows and from the 12.000 pigs that are in place) and has the capacity to accumulate 20 days, during which time it produces the gas and accumulates it in a hood. The energy is used to heat the nursery, heat the same digester (requires 40 degrees for a good bacterial process) and produce energy for self-consumption.

Luis Picat was not convinced to use feed to produce energy and waited until the system was implemented, because most biodigesters in pig farms operated with a mixture of effluents and corn silo. Now the company manages, in addition to improving the treatment of effluents, to fertilize the hectares of agricultural use and closed the virtuous circle of corn, meat, energy and better soils.

Side effect will be the improvement of animal welfare, since cleaner sheds are required and, consequently, air quality improves. A study on the carbon footprint on the farm showed that for every kilo of pig produced, between 2.2 and 3.7 kilos of carbon dioxide were generated. With the biodigester that impact was reduced by 18%.

Image 16 Biogas installation at the Cebil pig farm



(Source: La Nacion - El Cebil)

⁶⁹ https://inta.gob.ar/sites/default/files/inta_manejo_y_utilizacion_de_excretas_porcinas.pdf

⁷⁰ Luis Picat, owner of the farm and the Calidad pig slaughterhouse

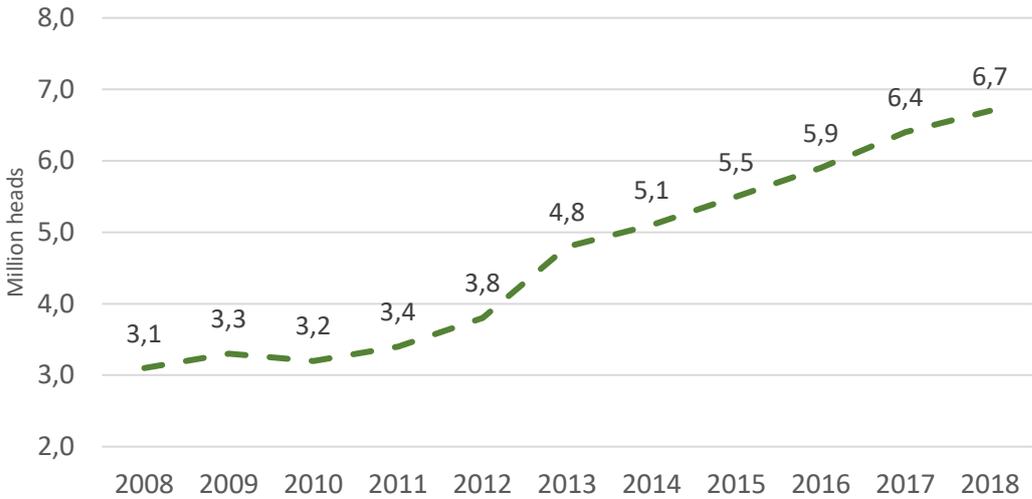
6.10 Pig slaughtering and processing

6.10.1 Pig slaughtering

In 2018 more than 6.7 million pigs were slaughtered, an increase of more than 10% compared to the previous year. In the last 10 years the slaughter quantity increased more than 116% (3.1 million pigs were slaughtered in 2008).

According to the latest data provided by the Ministry of Agroindustry, in the first four months of 2019, pig slaughtering grew by 3%, reaching 2.2 million heads.

Graph 28 Evolution of pig slaughter in Argentina (2008-2018) million heads



(Source: Agrivalue SA Based on data of Minagri 2019)

6.10.2 Categorization of slaughterhouse facilities in Argentina⁴

In Argentina there are approximately 450 slaughter plants in operation of which 95% is monitored by government authorities. These slaughterhouses are categorized according to the registered sanitary standards on county, provincial, national and international levels.

Slaughter and processing facilities in Argentina are categorized in different types according to the status granted by SENASA. In total 208 Argentinean slaughterhouses are allowed to slaughter pigs over 22 kg. For that, they receive official approval by SENASA. Most of these slaughterhouses are qualified to manufacture cold cuts and sausages; 42 of them also can slaughter weaner pigs below 22 kg.

Establishments where animals are slaughtered and that count on a cold room on its own premises that may or may not carry out manufacturing and / or industrialization tasks are called Matadero-Frigorifico (Slaughterhouse – Meat processing plant).

Within this category there are three type of slaughterhouse-meat processing plants considered as type "A", "B" or "C" (according to Decree No. 4.238 dated July 19, 1968 and its amendments).

Establishments that slaughter their own animals for own supply and / or third parties, destined for internal consumption and / or export, and may also purchase meat, products and by-products with the same objective are called Matarife Provider (slaughtering supplier).

Table 25 Categories of slaughter and meat processing facilities

Senasa regulation	Name	Description
1.1.29	Frigorifico	the meat processing establishment that has cold rooms authorized by SENASA
1.1.30	Matadero Frigorifico	Is the slaughterhouse-meat processing plant. The establishment where animals are slaughtered with a cold room that may or may not perform processing and / or industrialization.
	Matadero Frigorifico A	The 'A' type slaughterhouse-meat processing plant is understood as the industrial plant defined in 1.1.30 of these regulations. Its authorization corresponds to SENASA and includes federal traffic and export of products and by-products derived from slaughter and industrialized meats. The limitation of work shall be established according to the animal / time regime determined in section 2.2.28 of this regulation.
	Matadero Frigorifico B	The slaughterhouse-meat processing plant type 'B' means the establishment authorized to slaughter cattle, sheep, pigs and / or goats, in a maximum daily number of one hundred fifty (150) cattle, one hundred (100) pigs and three hundred (300) sheep and / or goats. The meat and offal of the animals slaughtered in these establishments must be sold and consumed, exclusively within the territory of the Province in which they are established.
	Matadero Frigorifico C	The slaughterhouse-meat processing plant of type 'C' means the establishment authorized to slaughter cattle, pigs, sheep and / or goats in a maximum daily number of eighty (80) cattle, fifty (50) pigs and one hundred sixty (160) sheep and / or goats. The meat and offal of the animals slaughtered in these establishments must be sold and consumed exclusively within the territory of the Province where they are established.
		Type B and C establishments may request the authorization of the National Animal Health Service to be able to carry out federal traffic after verification of the operational and administrative construction conditions established by said Service to meet the minimum requirements that such federal traffic requires
	Matadero Municipal	Are the rural slaughterhouses, establishments authorized to slaughter cattle, sheep and / or goats in a maximum daily number of fifteen (15) cattle and thirty (30) sheep and / or goats. Meat and offal of animals slaughtered in these establishments must be issued and consumed exclusively within the locality for which it was expressly authorized. They will be exceptionally enabled when supply reasons justify it.

(Source: Agrivalúe SA based on SENASA data 2019)

The implementing agencies shall determine the maximum amount of daily work according to the operating conditions within the maximum limits set by category, taking into account the provisions of section 2.2.28 of this Regulation. In the case of slaughterhouses and refrigerators type 'C' the National Animal Health Service according to the local health authority may exempt from the obligation to have a cold room and digester determining in each case the term of said exception, as well as the supplementary rules to satisfy the incineration and sterilization of waste and seizures. (Section replaced by art. 1 of Decree No. 489/81 B.O. 03/23/1981)

Table 26 Type of slaughter facility per province (2018)

	Matadero - Frigorifico	Matadero - Municipal	Matadero Rural (c/usuarios)	Matadero Rural (s/usuarios)	Total operators	Matarifes Abastecedores
Buenos Aires	52	3			55	159
Cordoba	24				24	206
Entre Rios	18	2			20	37
La Pampa	6	2			8	13
Santa Fe	19				19	117
Catamarca	1	1			2	9
Jujuy	1	1		1	3	4
Salta	5	3			8	34
Stgo. Del Estero	2				2	3
Tucuman	4				4	3
Corrientes	2	4			6	15
Chaco	7				7	19
Formosa	1				1	1
Misiones	4		1		5	4
La Rioja	2				2	2
Mendoza	6				6	43
San Juan	1	1			2	3
San Luis	7				7	14
Chubut	8	3			11	22
Nuequen	2	3			5	13
Rio Negro	4		2		6	44
Santa Cruz	3	2			5	6
Tierra del Fuego		2			2	1
Total	179	27	3	1	210	823

(Source: Agrivalve SA based on Dirección Nacional de Control Comercial Agropecuario 2018)

Table 27 Division of slaughter facilities per region in Argentina (2018)

Region	Matadero -Frigorifico	Matadero -Municipal	Matadero Rural (c/usuarios)	Matadero Rural (s/usuarios)
Center	119	7	0	0
North-East (NOA)	13	5	0	1
North-West (NEA)	14	4	1	0
West	16	1	0	0
Patagonia	17	10	2	0
Total	179	27	3	1

(Source: Agrivalve SA based on Dirección Nacional de Control Comercial Agropecuario 2018)

6.10.3 Geographical distribution of pig slaughtering

Of the 210 pig slaughterhouses with SENASA authorization and the more than 400 facilities allowed to further process the pig meat into fresh sausages, dried and salted products and conserves, more than 85% of these two type of companies are located in the center region, while in the South of Buenos Aires city the further processing plants are concentrated.

Pig slaughtering is concentrated in the provinces of Buenos Aires with more than 50% of the total amount of slaughtered pigs, followed by Santa Fe with 22% and Cordoba with 14%. These three provinces together are responsible of almost 90% of the total amount of heads slaughtered within Argentina. The remaining slaughter is taking place in Entre Rios (3%), Mendoza (2%) and the other provinces (6%) of Argentina. In 2018, 6.1 million heads were slaughtered in the territory of the provinces Buenos Aires, Cordoba and Santa Fe, when only 0.6 million more were slaughtered in the rest of the country that year.

The province of Buenos Aires was responsible for the production of almost 2 million pigs, while the same province slaughtered more than 3.5 million heads. The province of Cordoba produced more than 1.7 million pigs, while it slaughtered about 1 million heads. In the case of Santa Fe slaughter and production are running quite parallel around 1.2 million heads. The fourth most important production region Entre Rios produced 580 thousand pigs of which less than 50% was slaughtered in the same province.

Table 28 Geographical distribution of pig slaughtering in Argentina (2017-2018) in number of heads

Province	2017		2018	
	Production	Slaughter	Production	Slaughter
Buenos Aires	1.878.735	3.364.653	1.992.377	3.544.839
Cordoba	1.646.463	1.008.886	1.731.847	1.052.965
Santa Fe	1.2141.848	1.199.738	1.275.652	1.251.965
Entre Rios	524.160	242.727	582.071	270.100
San Luis	381.912	21.225	405.921	25.491
La Pampa	158.389	28.493	156.202	33.274
Salta	76.570	78.735	90.212	90.068
La Rioja	84.957	6.551	89.726	13.002
Chaco	71.149	61.717	76.977	67.207
San Juan	68.174	36.429	71.248	31.260
Misiones	45.843	63.810	52.512	63.790
Mendoza	49.102	127.629	43.957	133.832
Corrientes	42.655	17.248	41.855	17.351
Neuquén	32.934	31.678	97.956	37.486
Chubut	30.490	29.528	34.089	32.695
Rio Negro	31.258	32.760	34.417	35.585
Jujuy	26.144	12.619	30.025	22.708
Tucuman	17.201	17.495	14.830	20.319
Santiago del Estero	6.338	1.669	12.833	4.657
Catamarca	5.952	33.639	6.996	30.533
Santa Cruz	3.318	6.487	2.684	5.802
Formosa	1.624	1.500	1.270	787
Tierra del Fuego	0	0	366	366
Total	6.425.216	6.425.216	6.786.023	6.786.023

(Source: Agrivalve SA based on Minagri 2019)

The following maps show the sows stock, slaughter participation and number of slaughterhouses per province within the Republic of Argentina.

Image 17 Sow stock

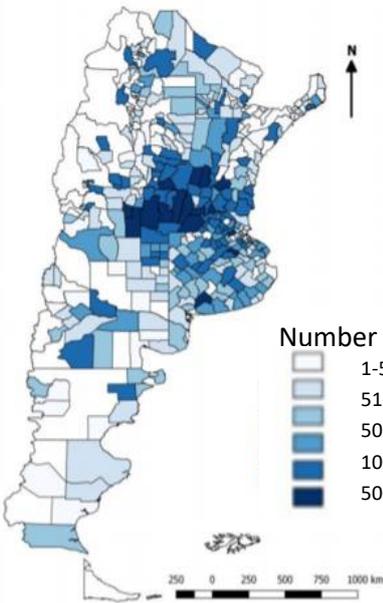


Image 18 Slaughter share (%)⁷¹

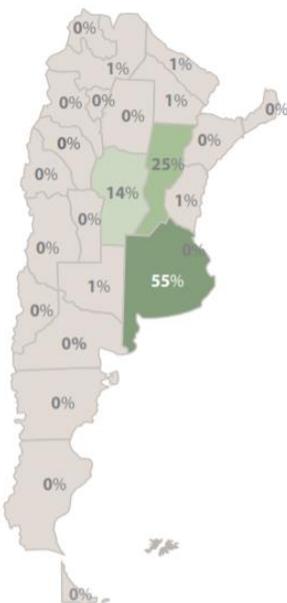
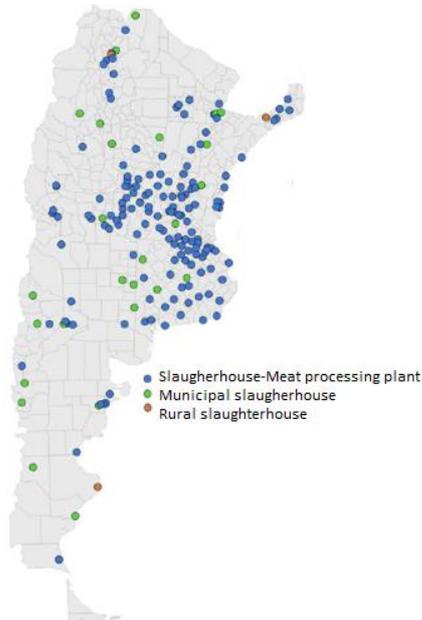
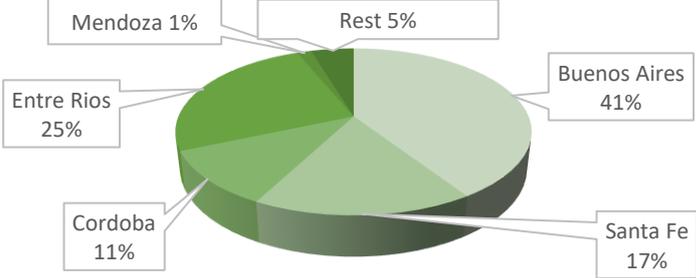


Image 19 Slaughterhouses

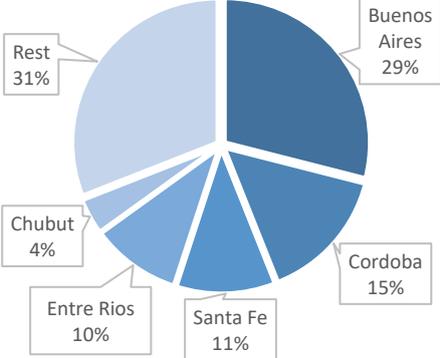


(Source: SENASA, RIAN INTA, MINAP and CAICHA)

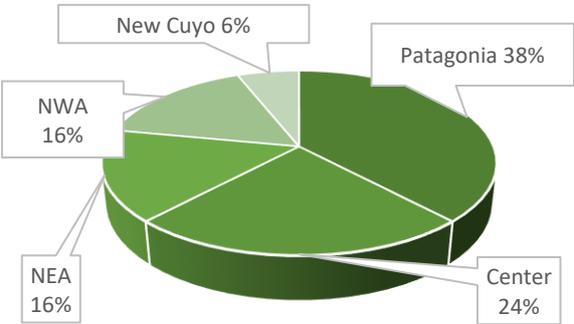
Graph 29 Pig Slaughter concentration in Argentina



Graph 30 National slaughterhouses



Graph 31 Municipality and rural slaughterhouses

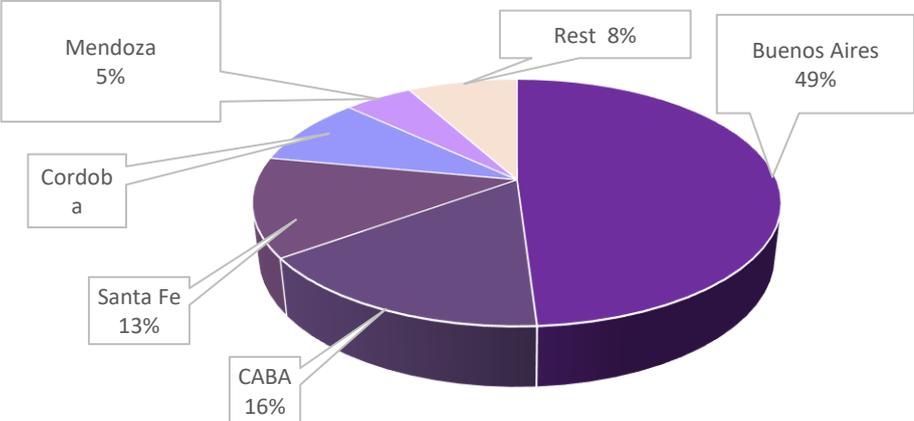


(Source: Agrivalue SA based on Coninagro)

⁷¹ Economic Area of CONINAGRO, Technical Report N°6 “Regional Economies – Pigs” (2018)

The sausage industry is mainly concentrated in the province of Buenos Aires with a 49% of the further processors as graph 32 “Chacinados” shows. The city of Buenos Aires, Santa Fe, Cordoba and Mendoza are counting for 43% of the facilities turning pig meat into sausages and or cold cuts.

Graph 32 Chacinados (sausages)



(Source: SENASA, RIAN Ganaderia INTA, MINAP and CAICHA)

6.10.4 Slaughtering facilities and technology

Argentina has got several modern slaughter and processing facilities. Some of them are authorized for export. The main interest shown by industry representatives is expansion of slaughter capacity and incorporation of technology for further processing (deboning). International meat market demands large volumes (often concentrated in a few cuts) with constant supply to be able to close agreements with distributors and commercial channels.

About half of the total production is produced by four processors, which are the most industrially and technologically developed in the sector.⁷²

In 2019 president Macri announcing the opening of the Chinese market for Argentine pork. China and Argentina reached an agreement and signed a sanitary protocol in which the Chinese government will accept the authorizations of SENASA of slaughter plants of bovine, poultry, sheep and swine meat. A Memorandum of Understanding (MOU) was signed that will expedite and give predictability to future authorizations of establishments interested in exporting beef, poultry, sheep and pork.

In total the Chinese customs approved the authorization of 22 beef and poultry establishments and 3 pork slaughterhouses. Pig slaughterhouses and processing plants La Pompeya, Campo Austral and Paladini were approved to send cuts to China.

Image 20 President Macri at La Pompeya in Marcos Paz (April 2019)



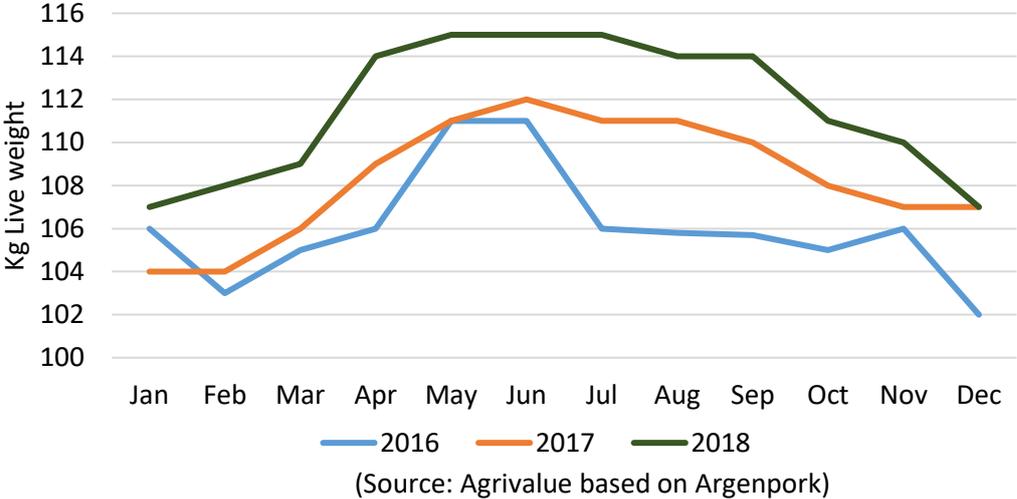
(Source: Prensa Agroindustria)

⁷² <https://www.pigprogress.net/World-of-Pigs1/Articles/2018/5/Argentinas-pig-business-is-breaking-records-286452E/>

6.10.5 Average slaughter weight

In Argentina the average slaughter weight in the last three years (2016 until 2018) has been between 102 and 114 kg live weight as shown in graph 33.

Graph 33 Average slaughter weight (expressed in kg live weight)



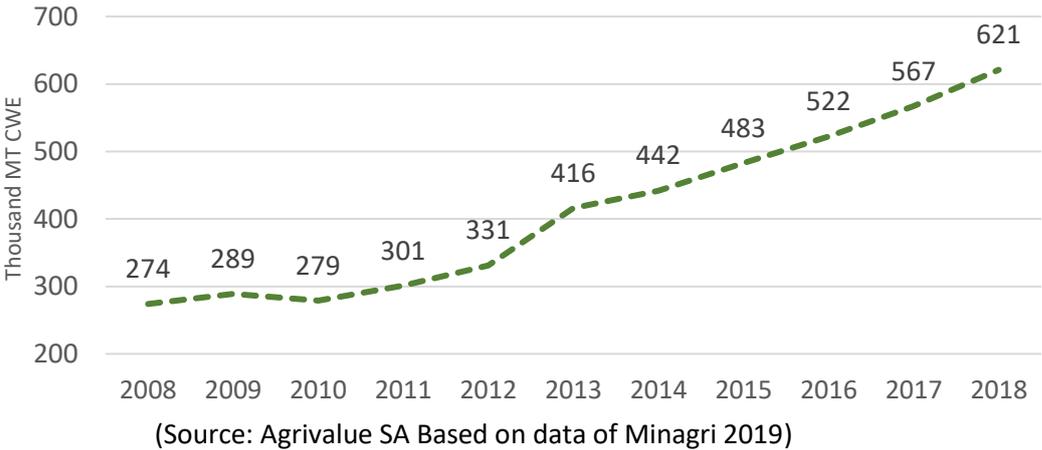
6.11 Pork

6.11.1 Pork production

Argentina approximately produces one kilo of pork for every five kilos of beef, but it is expected that the pig producers will continue reducing distances.

Argentina produced 620 thousand metric tons of pork in carcass weight equivalent an increase of 9% compared to 2017 (566.276 MT). During the last decade pig meat production increased 126%.

Graph 29 Evolution of pig meat production in Argentina (2008-2018)



Pork production expressed in carcass weight increased with 5% in the first 4 months of 2019 (201.000 tons), almost a third of the total production in 2018. For the year 2019 it is estimated that pork production will be equivalent to approximately 15 to 16 kilos per inhabitant, while imports will be 1 kilo per capita. Local production contributed 7 kilos per inhabitant in 2007, less than half of what it represents today, while import volumes were similar (almost 1 kg).

This continuous increase of Argentine production is stimulated thanks to the raise in domestic consumption and the recent initiation of exports. The expansion of the domestic market has basically been fed with local production. Another major drivers of the growth is the increase in amount of processing plants, both in the private as well as in the public sectors.

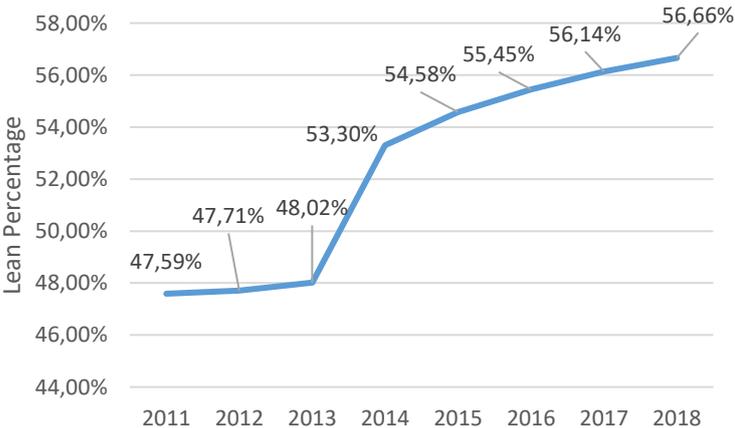
6.11.2 Pig meat quality – lean content

The quality of pig meat depends on several productive factors that are valued by consumers. From different links in the production chain they agree that the consumers demand lean, tasty meat, with less calories and cholesterol. Therefore the further processor wants every kilo of pork he purchases to have more muscle and less fat; while the producer finds it cheaper to feed pigs to produce meat than to accumulate fat.

In Argentine it is currently recognized that the most important quality criteria for pig meat is the muscle content or the proportion of lean tissue. The typing system consists of measuring the thicknesses of dorsal fat and longissimus dorsi muscle of the carcasses using an automatic optical probe. With these data measured in millimeters and applying a prediction formula, the lean tissue content expressed in % of carcass weight is estimated.

Table 29 and graph 34 Lean pig meat index development 2011-2018

Year	Lean Percentage
2011	47,59
2012	47,71
2013	48,02
2014	53,30
2015	54,58
2016	55,45
2017	56,14
2018	56,66



(Source: MAGyP - Pig Area 2019)

Table 29 and graph 35 show the considerable improvement of lean percentage the sector has achieved in recent years. With a lean percentage of 56.66% in 2018, the lean pig meat index improved 19% compared to the year 2011.

6.11.3 Further processing - the Argentine cold meats industry

From January to June 2019, the cold meats industry produced 310.893 metric tons of carcass with bone, 4% more than in the year before.

6.12 Domestic market retail

As mentioned before the final product of the pig industry, whether half carcass or cuts, is mainly destined to the domestic market, being very low the foreign sales.

The slaughter plants with provincial authorization allocate the products to the region where they are located, both to the party itself (46%) and to others nearby within the province (53%). Their main clients are the butchers (45% of the volume operated by the group), following in importance the industry and suppliers of local and regional scope. Regarding customer requirements, some

problems are mentioned to meet with the requested lean content and the continuity of sales in periods of animal shortage.

The plants with federal transit, commercialize their production not only in the province where they are located (57%) but also in others where 43% of what is produced is sent. In this stratum the purchases of the industry become more important, representing the 40% of the total produced, followed in order of importance by supermarkets and butchers. It is noteworthy that one of the plants is integrated and supplies 90% of the meat produced to its own factory. No problems mentioned to meet customer requirements mainly in relation to quality, health and continuity.

Slaughterhouses with federal transit and export authorization do not supply significant volumes to traditional butchers; their production is mainly destined to suppliers, supermarkets and the pork industry. To external markets, only a small percentage of production on is shipped, in the year of this inquiry by INTA mainly to Hong Kong. The exported products were mainly offal such as tail, tongue, ear, nose. In this stratum, some of the entrepreneurs mention that they are working hard on the promotion of fresh cuts like beef via the awareness of the butchers themselves and the development of strategies such as the sale of meat with vacuum-packed brand or in controlled atmosphere. In 2019 Argentine slaughterhouses in this category succeeded to export the first containers with quality pork, as mentioned previously in this report.

Table 30 Destination and commercial channels according to type of license (% allocation)

Transit Licence	According to geographical area				According to type of client			
	Dpt.	Rest of the province	Other provinces / Capital Federal	Export	Butchery	Supermarket	Industry	Warehouse
Provincial	46%	53%	1%		45%	10%	25%	20%
Federal	25%	32%	43%		20%	25%	40%	15%
Federal & export	28%	47%	24%	1%	1%	32%	26%	41%

(INTA, 2012)

According to the INDEC and Oxford Economics Institute, supermarkets have concentrated the retail trade activity, reaching 56,6% of the retail sales in 2016, followed by online retail (20%), electronics and home appliances stores (13,1%), and shopping centres (10,2%).

The effects of the economic slowdown affect Argentina's retail players differently: Argentina's retail formats under 500 m² performed slightly better than the larger ones. This is a consequence of continued urbanisation of the population (90,6%) that should reach 93% in 2018, according to the UN

There is a large ongoing investment in the retail sector in Argentina. Nearly all retail formats are increasing in number: supermarkets, wholesalers, traditional grocery stores, and shopping malls. New openings, mergers and acquisitions are expected to continue to grow moderately. However, the Argentinian retail market continues to face certain challenges such as high operating costs, inflation, bureaucratic barriers, and high taxes. Although import restrictions have been relaxed by Macri's government, high tariffs remain in place.

A significant number of consumers prefer hyper and supermarkets, as they find them more convenient in terms of time passed on shopping and prices. During the last couple of years, traditional stores have continued to lose market shares to hyper and supermarkets because of their highly competitive prices and discounts.

Hypermarkets, superstores, and warehouse stores account for approximately 35% of the Food and Beverage market (which accounts for approximately 72% of total sales). The biggest retailers and their market shares are Carrefour (24,6%), Jumbo/ Disco (18,1%), Coto (12,6 %), Walmart (7,9%), La Anonima (7,5%), Libertad/Casino (3,7%), Toledo (1,5%) and Eki (0,8%).

Although the retail sale of meat through hypermarkets and supermarkets is increasing in Argentina meat is still marketed mainly without labels, brands or certifications, in butchers' shops that represent 75% of the market share.

Table 31 Type of Argentine Retail outlets (2019)

Type of outlet	Description	Reference
Hypermarkets and supermarkets	Located outside the city centres, supermarket outlets sell food and other products, usually against the lowest prices.	Carrefour, Coto, Jumbo, Yaguar, La Anonima, Libertad, Cencosud, Disco
Small supermarkets with a small product range	Located in the city centres, sell food and other first necessity products. Higher prices	Carrefour Express, Mini Libertad
Small traditional shops (locally called "chino")	A type of a 'mini-market' located throughout neighbourhoods and downtown Buenos Aires	
Small shops selling one specific line of product	In each neighbourhood there are several small shops specialise in one line of product.	Bakeries, butchers and cheese shops.
Traditional markets and street markets	A type of outlet which sells fresh produce, usually fruits and vegetables.	Mercado de San Telmo , Mercado del Progreso, Feria de Mataderos

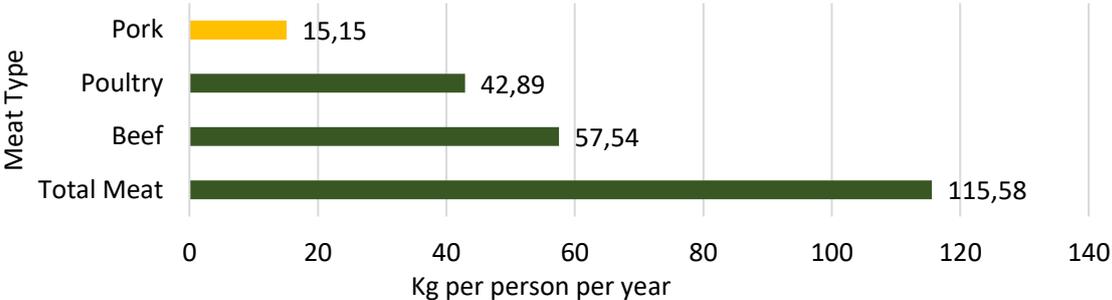
(Agrivalue SA based on Santander Rio 2019)

6.13 Argentine pork consumption

General meat consumption in Argentina is very different from the composition of the world's meat consumption. In 2018, almost 40% of the total meat consumed globally was pork. Except for certain nations, pork and chicken predominate in the incorporation of proteins in the diets of different countries in the world, while in Argentina beef consumption prevails.

In 2018, each Argentine consumed a total of 115.58 kilos of meat, the second largest volume in history, after the 116.67 kilos demanded in 2015. Respectively per capita consumption in the country was 57.54 kilos of beef, 42.89 kilos of chicken and 15.15 kilos of pork.

Graph 35 Argentine meat consumption (2018)

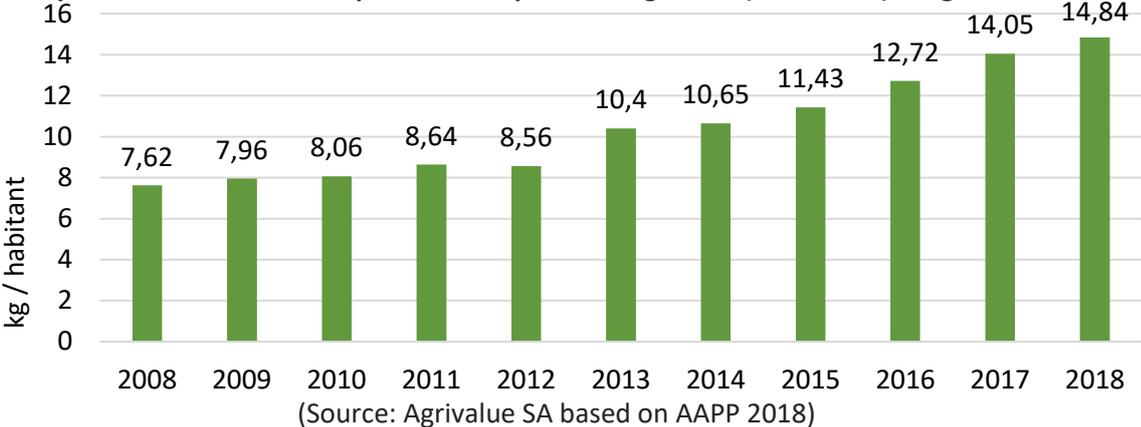


(Source: Agrivalue SA based on AAPP 2019)

Pork consumption in Argentina has increased in recent years and today Argentina is the 13th biggest pork consumer worldwide. In 2018 consumption has risen 8% compared to 2017. For 2019 it is expected that pork consumption will reach between 15 and 16 kg per person. This is a very important increase compared to the 7,5 kilos that was consumed 10 years ago.⁷³

These consumption figures show that Argentina has one of the highest growth rates in the world, only three other countries (Colombia, Angola and Vietnam) exceed the annual average 5%-rate of increase of Argentina⁷⁴.

Graph 36 Evolution of fresh pork consumption in Argentina (2008-2018) in kg/inhabitant



The increase in consumption can be explained by a sharp increase in beef prices which changed the diet of Argentines forcing consumers to search for alternatives. Consumer attitude changed, starting to appreciate the nutritional properties of pork, such as its minerals, vitamins and low fat content.

A fact to take into consideration is the short period in which Argentine consumption more than duplicated, from 6 to 16 kilos per inhabitant in a period of 14 years (2005/2019). There are not many international experiences of such intense growth in such a short period. Even more, taking into account the fact that in the second half of this period of frank expansion of pork consumption, the economy and consumption in general grew relatively little. Between 2011 and 2018 private consumption (all final goods and services) expanded by only 5% (in 7 years).

The president of the Association of Pig Producers of the province of Buenos Aires Alejandro Lamacchia⁷⁵, estimates that Argentines will consume 25 kilos of pork per year by 2025.

This growth in consumption is accompanied by improvements in the processes of production, genetics, research and management, resulting in a quality improvement. Several actors participated in that improvement. The genetics companies, animal nutrition suppliers that have advanced a lot, as well as the support from INTA improve the quality of the meat.

The Argentine consumer began to eat more fresh pig meat, thanks to consumption stimulation campaigns such as “Today Pork” (Hoy Cerdo), which was successfully followed up by “Eat Good, Eat Pork” (Come bien, Come Cerdo) as mentioned in paragraph 6.14.

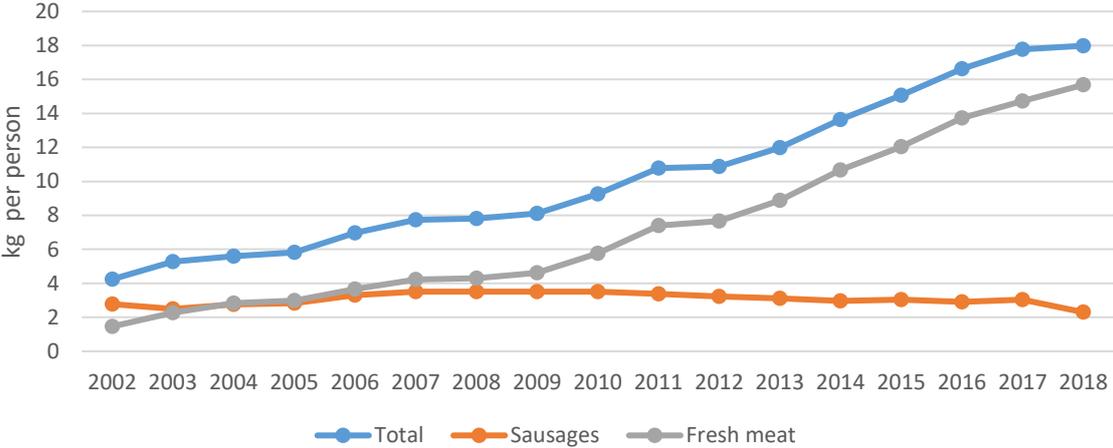
Pork sausages and cold cuts consumption remained stable.

⁷³ <https://infopork.com/2019/04/argentina-exportara-carne-de-cerdo-a-china/>

⁷⁴ Actualidad y perspectivas en la cadena de la carne de cerdo – J. M. Garzón y V. Rossetti – Ieral (2019)

⁷⁵ www.on24.com.ar

Graph 37 Type of pig meat consumption in Argentina (2002-2018)

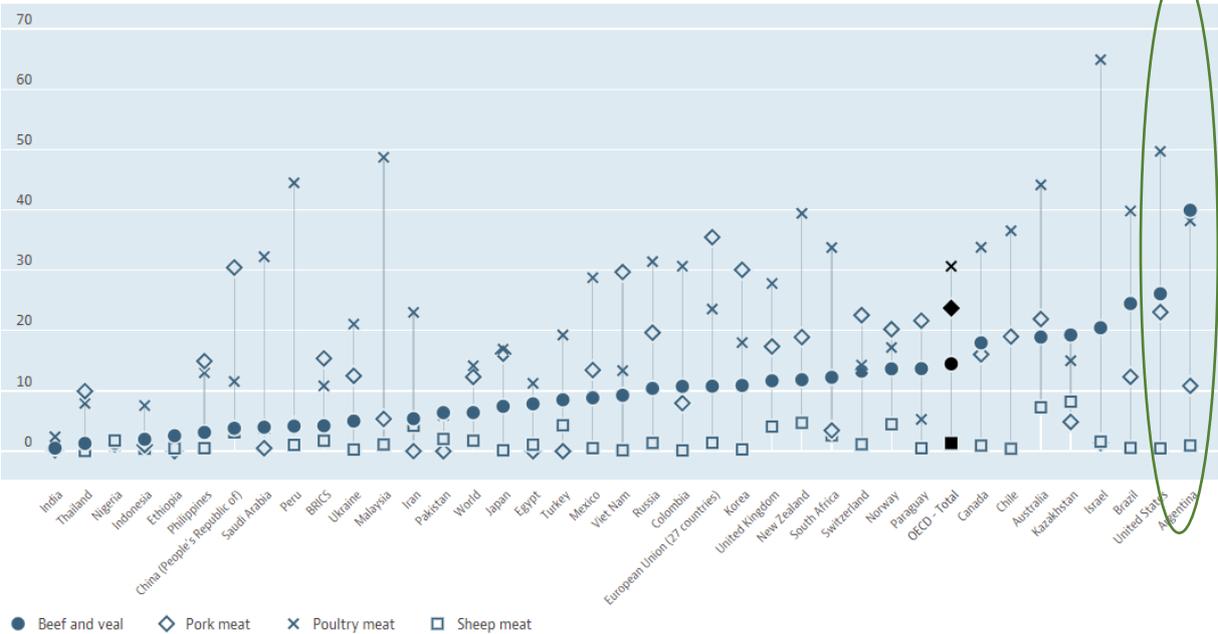


(Source: Agrivalue SA based on AAPP data)

Domestic consumption of pork can continue to grow for several more years. A level of 22 kilos per capita looks feasible, considering the consumption structure observed in other meat producing and exporting countries.

But for the local consumer to accept 6/7 kilos more than the current ones⁷⁶, which basically requires displacing other meats, it will be necessary to sustain the quality of the product and also maintain a competitive market price (gondola). In this last aspect, some references from other countries indicate that a price gap between bovine and swine meat of 30% / 35% (in favor of the latter) could be sufficient.

Graph 38 Meat (Beef and veal, Pork, Poultry and Sheep) consumption Kilograms/capita (2018)



(Source OECD Agriculture Statistics: OECD-FAO Agricultural Outlook (Edition 2019))

⁷⁶ <https://infopork.com/2019/06/crece-el-consumo-de-carne-de-cerdo-y-se-encamina-a-un-nuevo-record/>

6.14 Promotion and marketing

The National Government is demonstrating a strong commitment to promoting the consumption of pork. During 2017, it carried out, together with private institutions, a campaign focused on the consumption of fresh meat under the motto “Come bien, Come Cerdo” (Eat well, eat pork), which followed up on the campaign previously developed “Hoy Cerdo” (pork today).

Image 21 Come Bien, Come Cerdo promotion campaign



(Source: AAPP)

By signing a Framework Agreement, seven entities of the Pig Sector of Argentina launched the Consumer Promotion Program for Fresh pig meat, with the "voluntary" contribution of \$ 1.- per hog sold which will generate a fund, which is expected to increase with a similar contribution from the National Government

The seven entities involved:

- the Argentine Association of Pig Producers (AAPP)
- the Association of Pig Producers of Santa Fe (APPORSAFE)
- the Chamber of Pig Producers of Córdoba (CAPPCOR)
- the Chamber of Swine Producers of Entre Ríos (CAPPER)
- the Swine Farming Technology Exchange Group (GITEP)
- the Porcino Magro marketing group (PORMAG)
- Sociedad Rural Argentina (SRA)

The objective of the program, in addition to the promotion of consumption, is to reduce the seasonal fall in the price of pigs between the months of April and July, which occurs every year.

6.15 Trade

Comparing with the rest of the world Argentina has only a very low participation of 0,1% of global trade. The country was ranked No. 33 in the world ranking of pork exporters in 2018. For example, Brazil and Chile accounted for about 3,8% and 1,5% respectively. In 2016 Argentina ranked No. 54.

Traditionally the Argentine pig production and processing sector shows a trade deficit. In 2018 there was an important increase of pork exports by 23.192 metric tons (a higher volume of 59% compared to 2017), nevertheless Argentinian pork trade balance was heavily deficit because exports of pork and pork products approached 38 million US dollar, while imports exceeded 123 million US dollar.⁷⁷

In the first four months of 2019, pork exports increased by 53% in volume (7.586 metric ton) and 48% in value (12.2 million US dollar) compared to the same period of 2018.

⁷⁷ Indec (2018)

The main reasons for the growth in exports are the devaluation of the peso, the increase of local production, the opening of new international markets and the implementation of a common export strategy for companies.

Graph 39 Argentine pork trade values in 2018-2019 (*thousand USD)



(Source: Agrivalve SA based on La Nacion and INDEC 2019)

6.15.1 Import of pig meat and by-products into Argentina

In 2017 imports reached a total value of 118 million US dollar. In 2018, 123 million US dollar and in 2019 imports fell 34% in value (US\$32.5 million) and 17% in volume (13.012 tons).

Brazil is the main supplier with a participation in this area of 87% of total supply (85% in 2017). A large part of these shipments is frozen boneless pork meat. As regards cold cuts and sausages, 87% of Argentine imports are of Brazilian origin, 12% Spanish and 1% Italian.

Table 32 Specification of Argentine pig meat imports

Cut	Metric tons	US\$ per ton	Cut	Metric tons	US\$ per ton
Pulp ham muscles included	3.472	2.816	Others (leg, tortuga, Dewlap)	1.027	2.678
Pulp ham muscles separated	9.004	3.113	Carre with bone	374	3.181
Paleta pulp	6.516	2.718	Pork breast with bone	9	3.402
Boneless Carre	505	3.139	Others with bone	405	3.998
Pork Belly	1.816	3.372	Frozen ham and palette with bone	19	2.293
Loin / sirloin	755	2.806	Back fat	1162	1.499
Boston Shoulder	9.281	3.009	Shoulder and Leg Ham	175	1.327
Troceo cuts - trimming	589	2.411	Leather	69	726

From left to right: pulpa jamon musculos juntos, los demas (garron, tortuga, papada), pulpa jamon musculos separados, carre con hueso pulpa de paleta, pechito de cerdo con hueso, carre sin hueso, los demas con hueso, panceta, jamon y paleta con hueso congelada, lomo / solomillo, tocino con lomo, bondiola, tocino de pernil y paleta, recortes de troceo -trimming, cuero

(Source: Agrivalve SA based on CAICHA 2018)

The decline in imports is due to the fact that Brazil increased its exports to China and reopened the Russian market, which it had lost due to sanitary issues. The devaluation of the peso also influenced.

6.15.2 Export of pig meat and by-products

Argentina⁷⁸ still is not a pig meat exporter, although the country is systematically sending shipments since June 2018. The country requires more volume, more markets and more participation of the different stakeholders within the pig production chain (both farmers and processors) to create itself a position to enter the market which is controlled by a quite selected group of global suppliers. Traditionally, the main export market for Argentina has been Russia, with 95% of the exported volume, followed by Hong Kong and Africa.

In 2018 Argentina produced 620.549 thousand tons of pig meat of which 23.192 tons were exported, an increase of 59% compared to 2017. Main destinations of Argentina’s meat were Hong Kong, Russia (frozen meat with bones, half carcass, pork leg and pork shoulder) and South Africa.

Growth opportunities in the export market are considerable, when taking into consideration the current export volumes of Argentina’s neighbouring countries Brasil and Chile.

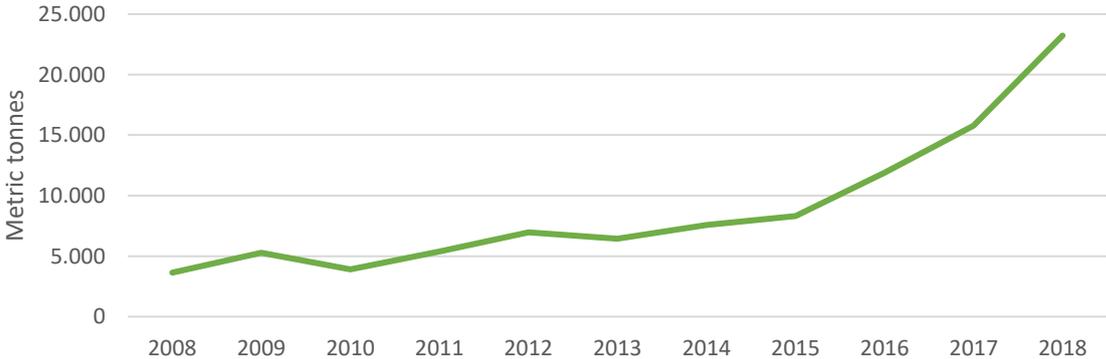
Brasil exports approximately 760 thousand metric tons carcass weight equivalent, while Chile supplies the export markets with 180 thousand metric tons on a yearly basis. The exports of Brasil outweigh the total pig production volume of Argentina (760 versus 660 thousand metric tons in 2019).

In the first five months of 2019 exports have increased with 51% compared to the same period of 2018 reaching 9.524 tons. In the last 10 years exports have increased by 638%.

The leader of this rise is Argenpork⁷⁹, the Consortium for the Export of Argentinian Pork, created in October 2015. It is currently comprised of 18 companies. Since its beginning, the exports of the consortium have grown: 871 tonnes in 2017; almost 5.000 tonnes in 2018; and 3.900 tonnes in 2019 (until April), aiming to reach 9.000 by the end of the year.

The pork cuts bondiola, pechito and matambre relegated by the reign of beef are making their way in the Argentine export offer. The latest foreign trade numbers of swine meat reflect the growth of activity in the foreign market, but also in the preferences of local consumers.

Graph 40 Development Argentine exports 2008-2018 (metric tons)



(Source: Agrivalue SA based on SENASA and Argenpork data)

The time is favourable and investments by the companies are expected to increase the stock of sows and to increase the production of pork.

⁷⁸ Juan Manuel Garzón and Valentina Rossetti representatives of the Fundación Mediterránea (IERAL)

⁷⁹ Interview with Guillermo Proiotto (Argenpork) 2019

The opening of the Chinese market to Argentinian pork is of great importance. With a consumption per capita of 56 kg in 2018 China is the first consumer of pork in the world and is facing insufficient domestic supply because of the African swine fever (ASF) outbreaks in China.

China approved the opening of its market to pork cuts, but not yet to by-products (this was what the sector aimed for), because China is the main consumer of feet, ears, heads, offal, etc. In a new deal with China, Argentina will now be able to export pork to the world's largest consumer of pork from Argentina's meat-packing plants.

In this first agreement, China approved the protocol for cuts of meat but not for by-products. It must be highlighted that the signing of the protocol to be able to export pork was carried out through negotiations between the Ministry of Agro-Industry, the SENASA, and the Ministry of Foreign Affairs and Worship. In April, Mr Etchevehere went on a commercial mission to China and signed the authorizing document together with the Vice Minister of the General Administration of Customs of China, Mr Li Guo.

The Argentine Minister of Agro-Industry, Mr Luis Miguel Etchevehere, visited, together with the Vice President of the Agri-Food Health and Quality National Service (SENASA), Mr. Guillermo Rossi, and the President of Paladini, Mr Juan Carlos Paladini, the premises of the meat processing company located in the region of Santa Fe.

Image 22 Minister Etchevehere at Paladini



(Source: Clarin Group)

Three cold-store plants⁸⁰ are authorized to export pork to China; La Pompeya, Campo Austral and Paladini. Argentina is expected to export a total of 18 thousand tons of pork to China during the first year.

Image 23 Paladini facility



(Source: enfoco21)

In August 2019 the meat processing plant Paladini will carry out the first shipment of Argentinian pork to China⁸¹, 10 containers of between 20 and 22 metric tons of pork each, during the first week of August.

The health authorization of this meat Processing plant was announced by President Mr Mauricio Macri, in April 2019.

Spain and Denmark, two of the large pig producing countries perform a better export business, by exporting mostly by-products instead of cuts. Thus, the quality cuts are consumed internally, while the by-products are sent abroad, and as such they make optimal use of the carcass. Argentina says they are negotiating further to get the protocol as well for exporting by-products soon.⁸²

⁸⁰ <https://www.porkbusiness.com/article/argentina-approved-export-pork-china-us-pork-trade-suffers>

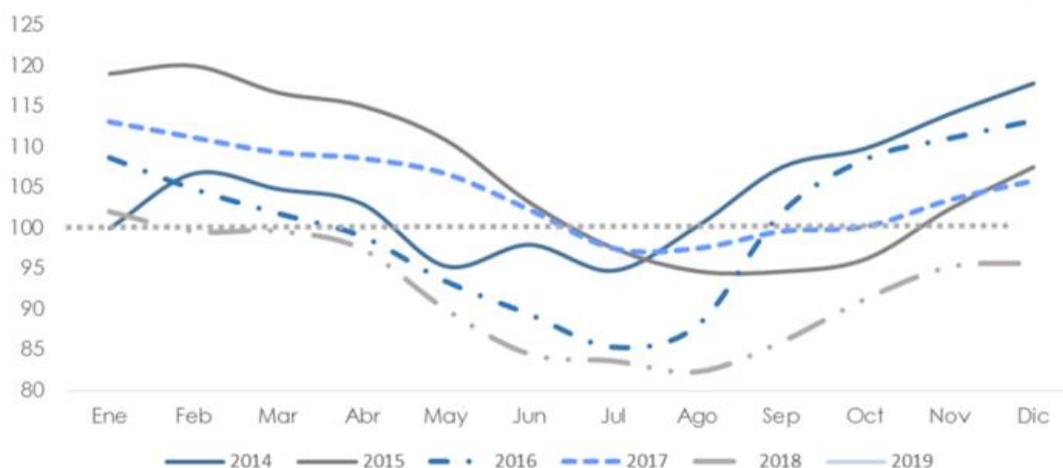
⁸¹ Friday, August 26th, 2019/ SENASA/ Argentina. <https://www.argentina.gob.ar> (August 2019)

⁸² https://www.clarin.com/rural/sector-porcino-pleno-auge-crecieron-produccion-consumo-exportaciones_0_hTJ7JKx6O.html

6.16 Pig pricing

As from January 1996 the Pork Price Information System (SIPP) was implemented. This systems allows the authorities to supply the public with commercial data. SIPP is maintained by the Ministry of Agriculture and based on the voluntary supply of data by the slaughterhouses, users and producers of the important provinces. The objective of the system is to supply the market with clear and transparent price references on the commercialization of pork.

Graph 41 Maximum average weighted constant general hog price index evolution (Jan. 2014 = 100)



(Source: MAGyP 2019)

Based on SIPP the Ministry of Agriculture also prepares weekly price development comparison of the hog and feed raw materials (graph 43), as well as international price comparisons (table 33).

Graph 42 Hog and Maiz-Soy mix price development in 2019 per week (Arg pesos)

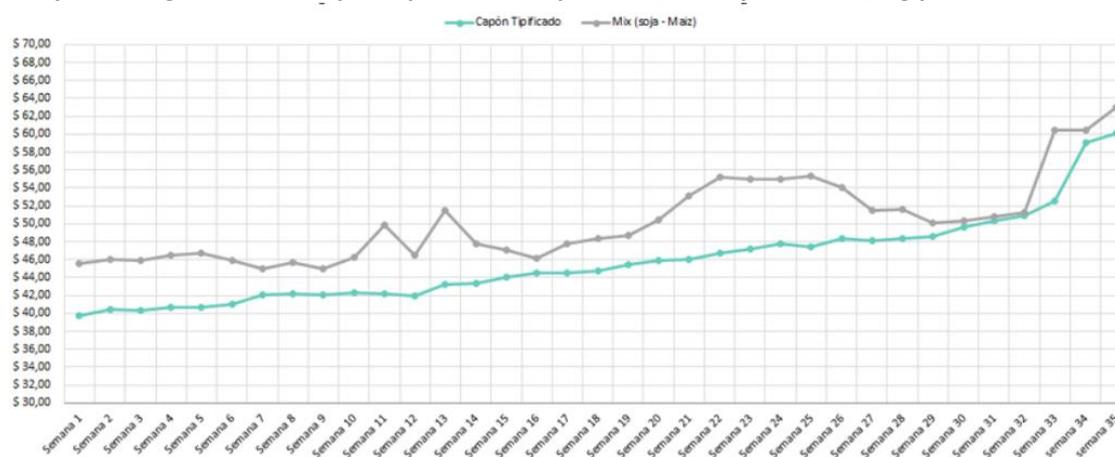


Table 33 International price comparison live pig in Argentina and Brasil in 2018 (in US\$/kg)

Month	Jan	Feb	Mar	Apr	May	June	Jul	Aug	Sep	Oct	Nov	Dec
Argentina	1.44	1.41	1.40	1.40	1.19	1.06	1.06	1.00	0.95	1.08	1.14	1.12
Brasil	1.06	0.97	0.89	0.82	0.75	0.78	0.79	0.75	0.77	0.85	0.83	0.83

(Source: Ministry of Agroindustria based on SIPP)

With regards to both the price levels of live pigs and processed pig meat the industry's Chamber CAICHA publishes its own price list.

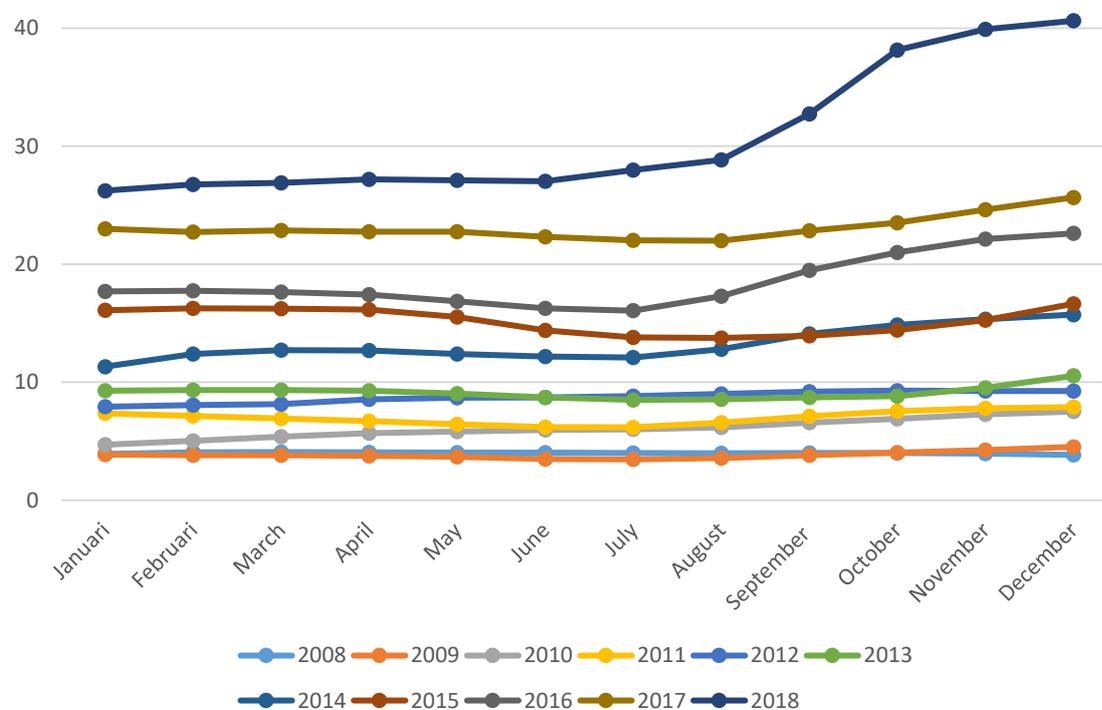
Table 34 Referential cold cut prices CAICHA July 2019
(Average wholesale prices, ex-works, without VAT)

Referential Value	Arg Pesos \$/kg
Raw ham	384
Pernil de cerdo	318
Cooked ham	211
Cooked cocido de pata de cerdo	151
Salame milan	242
Salamin	312



(Source: Agrivalue SA based on CAICHA)

Graph 43 Evolution of the live pig price period 2008/2018 (ARG \$ / kg)



(Source: Agrivalue SA based on own data CAICHA)

7. PIG PRODUCTION COSTS IN ARGENTINA

In 2018 the pig production activity in Argentina suffered a lot because of the devaluation of the peso which was felt intensely, since corn and soybeans prices are in dollars and sales prices slowed down. Production costs climbed between 100% and 120%, while sales prices only increased 32%.⁸³ The production units that are productively efficient can get through the moment better, but many farmers were forced to stop.

7.1 Main components of pig production costs in Argentina

In Argentina, the barrier to entry into the pig industry is not low. The investment required to raise a technified farm amounts to US\$ 7.000 per sow. A small farm of 50 sows, the minimum size to be considered a commercial exploitation, requires a disbursement of US\$ 350.000.

This amount includes not only the sow but also the entire structure from the sheds, the feed plant and the feed stock for the first six months of operation. According to GITEP⁸⁴ (Pig Farming Technology Exchange Group), the number per sow can be up to US\$ 10.000, fluctuating based on the technology that one wants to introduce into the production process.

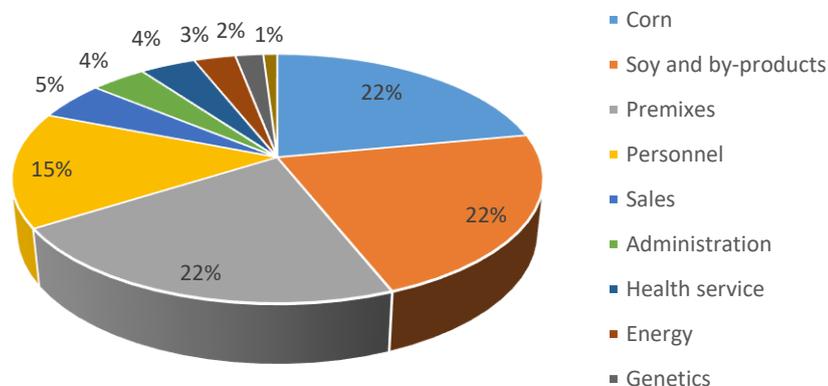
There are several models of construction of sheds, but the most widespread in the country is the system known as confinement; everything under a shed. As an example, an establishment of 1.000 sows can be developed on a 50 hectares site, where only 10 ha are destined to the sheds.

The model of natural ventilation with automated curtains (up and down controlled by temperature sensors) is complemented by an automatic fattening. The main threat suffered by confined systems is corrosion. In other countries (Chile or the United States) many farms are made of wood, which significantly reduces costs, something that the GITEP group is evaluating.

As for the recovery of the investment; the margins fluctuate according to the levels of productivity of each establishment, but in recent years they are between 8 and 20% per year on sales. According to GITEP specialist in no case should it take more than 10 years to obtain a total return on the initial investment. The farms associated with GITEP have in average a production of 3.200 kilos per sow per year, representing a total turnover of US\$ 60.800 annually in the case of a farm of 50 sows.

66% of the total production costs concerns cost related to animal nutrition (corn, soy, soy by-products and premixes). 15% corresponds to labour, while 10% of the production costs are related to sales and administration. Health service counts for 4% of the total costs, while energy and genetics, represent 3% and 2% of the total costs respectively.

Chart 4 Production Costs



Source: Agrivalue based on GITEP (2019)

⁸³ <https://observatoriorural.com.ar/2019/02/08/casi-cuatro-mil-productores-porcinos-menos-en-buenos-aires/>

⁸⁴ Special Report on the Pig Industry GITEP (Guatri 2019)

7.2 Profitability

In 2017 the profitability of the business was positive, without major variations in the raw materials or hog prices. Mainly the relative stability of the feed prices (+ 3.2%) explained the improvement that the profit margins showed that year (revenues rising to 22.7% and costs at 11.9%), despite increases of other items of total costs. In 2017 the cost of production was of the order of ARG \$18.5 per kilogram alive and the price of live kilo was around ARG \$24 per live kilo.

The loss of profitability of 2018 can be explained by a sharp rise in the feed cost. In 2018 revenues increased 32.4% while costs increased 63.9%, with feed growing 82.0%. In 2018 the production cost ranges between 20 and 24 Argentine pesos per kilo live weight and the price received by the producer was 28 pesos per kilo live, Therefore, only very efficient operations were profitable.

So far in 2019 the nominal trajectory of income and costs begins to converge around 16% (May vs. December), with feed costs rising to 14.2% and the live kilo value of the hog increased to 15.5%. Feed prices are closely linked to the exchange rate and international values of agricultural commodities. The stability of this item of costs in the remainder of the year 2019 will then depend on how stable the two variables referred to above are shown⁸⁵.

Table 35 Evolution of incomes and costs in Argentine pig farms

Annual average variation and a preliminary data 2019 (in nominal values)

Concept – Period	2017	2018	May-Dec 2019
Sales income	22.7%	32.4%	15.5%
Main Costs			
Labour	22.1%	23.0%	20.0%
Feed	3.2%	82.0%	14.2%
Health and insemination	54.8%	44.4%	33.3%
Genetics	22.7%	32.4%	15.5%
Energy	47.4%	39.1%	32.4%
Transport	21.2%	39.1%	16.7%
Total costs	11.9%	63.9%	17.0%

(*) Refers to a pig farm with 250 sows operating with a high level of efficiency in the region of Malena.

(Source: Agrivalue based on IERAL-Fundación Mediterranea data)

Argentine producers can take advantage of the opportunities offered by the domestic market and export if profitability levels pick up. But also, in 2019 the reality is that in the schemes of lower productivity, the recovery of the margins is only enough to reduce losses. These producers lose between \$2.9 (<250 sows) and \$0.8 Argentine pesos (<500 sows) for every kilo of hog produced. In high productivity farms, on the other hand, the economic results have returned to the positive terrain (about \$4.9 for farms and \$6.5 Argentine pesos per average kilo in farms ranging respectively from 250 to 500 sows). Although with values significantly lower than those observed in 2016 and 2017.

7.3 Taxes

In the new tax reform promoted by the National Government, the tax pressure of the three leading meat production chains in Argentina was sought. Currently, the production and marketing of animals and beef, pork and poultry are taxed equally with a 10.5% VAT.

⁸⁵ Actualidad y perspectivas en la cadena de la carne de cerdo – IERAL (2019)

8 STAKEHOLDER ANALYSIS

8.1 Government institutions

The main institutes governing the Argentine pig sector on a national level are the Ministry of Agriculture, Livestock and Fisheries, SENASA, ANMAT, INTA and INTI. Besides each province has its own authorities such as the Ministry of Agroindustry of Buenos Aires and the Secretary of Production of the Province of Entre Rios.

Table 36 Government institutions in Argentina

Nr.	Company
1	Ministry of Agriculture, Livestock and Fisheries
2	SENASA
3	ANMAT (INAL)
4	INTA
5	INTI
6	RUCA
7	CONAL

(Source: Agrivalue SA 2019)

8.2 Argentine pig genetics suppliers

Argentina has several players within the field of pig genetic for intensive, semi-intensive and extensive production. Some suppliers are multinational players and others are of 100% Argentine origin as presented hereafter.

Table 37 Argentine pig genetics suppliers

Nr.	Company
1	Agrocere PIC Argentina
2	Topigs Norsvin Argentina
3	La Botica Genética Porcina SA
4	C.I.A. SMR
5	Choice Genetics
6	Che Tapuy SA Argentina
7	Ceres Nucleo Genético Porcino
8	Hypor (Hendrix Genetics)
9	Genetica Austral (La Piamontesa)
10	Genetica Porcina Danesa S.A.
11	El Aguila Crespo SA

(Source: Agrivalue SA 2019)

8.3 Argentine pig producers

The main Argentine pig producer is Paladini with approximately 12.000 sows, followed by La Piamontesa, Pacuca and Isowean with about 8.500, 7.000 and 5.600 sows respectively.

In table 38 pig producers with more than 1.500 sows are presented, while the following companies have between 1.000 and 1.500 sows in production; Piggy Land de Cabaña Las Lilas, The Good Pig, Lartirigoyen, Superporco, La Quimera, Yvate, Agroporc, Vidra S.A., Llorente, Uniporc, La Elvira, Las Chilcas and Saraelal.

In its annual awards event in December 2018 GITEP, the main association that joins the main primary production establishments, genetic suppliers, feed suppliers, technology suppliers, laboratories and institutional institutions granted the first price to the following primary producers:

1. Best farm in the range of 0 to 1.000 sows: SARAELAL
2. Best farm in the range of 1.000 to 2.000 sows: UNIPORC
3. Best farm in the range of + 2.000 sows: Cabaña Argentina.

Table 38 Main Argentine Pig Producers (2019)

Nr	Company	Estimated Quantity of sows
1	Paladini S.A. (Paladini San Luis and Santa Fe)	12.000
2	La Piamontesa	8.500
3	Pacuca – Cabaña Argentina	6.800
4	Isowean	5.600
5	La Pelada	4.332
6	AGD	3.400
7	Camurri	2.600
8	Los Odwyer	2.250
9	Ingacot	1.800
10	Motape-	1.700
11	Tierra Greda	1.650
12	Porcal	1.630
13	Gagsa	1.580

(Source: Agrivalve SA based on GITEP and Minagri data)

8.4 Slaughterhouses

In 2017 the top three slaughterhouses in Argentina consisted of La Pompeya, the Cooperative of ex workers of the slaughterhouse Minguillon and Paladini SA.

In the end of 2018, beginning of 2019, the ranking of slaughterhouses has changed. La Piamontesa, the 6th largest slaughterhouse in 2017, purchased the primary production facilities and slaughterhouses of Campo Austral from the Brazilian BRF and enter the top 3.

The following table shows the ranking in 2017, while some of the main slaughterhouses with more than 150.000 heads slaughter on a yearly basis are discussed in the following paragraphs.

Slaughterhouse Qualitá received the Dutch delegation during the Argentine pig mission organized by Agrivalve SA in 2018.

Table 39 Main Pig Slaughterhouses in Argentina (2017)

Nº	Establishment	Slaughter Head/Year	Located	Province	%.
1	Frigorífico La Pompeya Sacifya	1.024.429	Marcos Paz	Buenos Aires	15,7%
2	Cooperativa De Trabajo Ex Empleados Del Frigorífico Minguillon Ltda	517.792	Moreno	Buenos Aires	8,0%
3	Frigorífico Paladini Sa	451.164	Rosario	Santa Fe	6,9%
4	Campo Austral SA	428.028	Pilar	Buenos Aires	6,6%
5	Ceryvac S.A.	156.628	La Matanza	Buenos Aires	2,4%
6	La Piamontesa de A. Giacosa Y Cia. S.A.	153.823	San Justo	Córdoba	2,4%
7	Rafaela Alimentos Sa	133.774	Castellano	Santa Fe	2,1%
8	Alimentos Magros S.A.	126.225	Unión	Córdoba	1,9%
9	Frigorífico Sudeste Sa	119.033	Unión	Córdoba	1,8%
10	Carnes Del Interior S.A.	108.768	Paraná	Entre Rios	1,7%
11	Frigales Srl	103.970	Gral. Arenales	Buenos Aires	1,6%
12	Tutto Porky'S Srl	98.468	Gral. Obligado	Santa Fe	1,5%
13	Allpork S.A.	96.919	Mercedes	Buenos Aires	1,5%
14	Frigorífico Novara Sa	95.187	Santa María	Córdoba	1,5%
15	Frigorífico Guadalupe S.A.	93.917	La Capital	Santa Fe	1,4%
16	Frigorífico Qualitá S.A.	92.968	Colón	Córdoba	1,4%
17	Cer2 Sociedad Anonima	92.769	Chacabuco	Buenos Aires	1,4%
18	Ln Campos Y Alimentos S.A	90.248	San Andres De Giles	Buenos Aires	1,4%
19	Carnes Rojas De Carnes Rojas S.A.	85.093	Lincoln	Buenos Aires	1,3%
20	Reg. San Antonio de Areco S.A.C.E.I.	79.546	S A De Areco	Buenos Aires	1,2%
	Others	2.271.609			35,0%
	Total	6.420.358			100%

(Source: Agrivalve SA based on Caicha and Argenpork data)

8.5 Private institutions (associations, knowledge institutes and others)

There are many private institutions in Argentina dedicated to defending the industries' interests and supply service, information, know how or technologies to the Argentine local farmer and processing industry. Besides there are initiatives to promote consumption and stimulate export. Please find in this chapter the general institutions, and the institutions dedicated to pig farming and pig processing.

8.5.1 General institutions

Table 40 Main Argentine private institutions for production in general

Nr.	Company
1	Sociedad Rural Argentina (SRA)
2	Federacion Agraria Argentina
3	Federación Económica de la Provincia de Buenos Aires
4	Coninagro

(Source: Agrivalve SA 2019)

8.5.2 Pig farming institutions

Table 41 Main Argentine private institutions for pig production in specific

Nr.	Company
1	Argentina Association of Pig Producers (AAPP)
2	Association of Pig Producers from Buenos Aires (APROPORBA)
3	Association of Pig Producers from Santa Fe (APPORSAFE)
4	Chamber of Pork Producers from Entre Rios (CAPPER)
5	Chamber of Pork Producers from Córdoba (CAPPCOR)
6	Group of Technicians and Pig Producers of the Southeast of Buenos Aires Province (GTPC)
7	Pig Production Operation Technical Interchange Group (GITEP)
8	El Productor Porcino
9	Pormag (Porcino magro = Lean Pork)
10	Centro de Información de Actividades Porcinas (CIAP)
11	GIDESPORC
12	Argentine Pork Export consortium (of pig producers) Argenpork

(Source: Agrivalve SA 2019)

8.5.3 Main Argentine private institutions for the processing industry

CAICHA, AFIC and UNICA are the three most important entities supporting and defending the slaughter and meat processing industry.

Table 43 Main Argentine private institutions for processing industry

Nr.	Company
1	Argentine Chamber for the Industry of Sausage producers (CAICHA)
2	Association for slaughterhouses and meat industries (AFIC)
3	Unión de la Industria Cárnica (UNICA)

(Source: Agrivalve SA 2019)

8.6 Input suppliers

8.6.1 Animal nutrition

The main animal nutrition suppliers in Argentina are presented in the following table. Besides the companies mentioned in this table other suppliers are amongst others Insuquim, Elanco S.A., Novus Argentina S.A., Núcleo 3 S.A., Nutrefeed S.A, Porfenc S.R.L. and SAF Argentina S.A.

Table 46 Main Argentine animal nutrition suppliers

Nr	Company	Origin
1	Alltech Biotechnology SRL	USA
2	Biofarma S.A	Argentina
3	Nutrimás S.A.	Argentina
4	Nutrifarms SRL	Argentina
5	Teknal SA	Argentina
6	Provimi Argentina SA	The Netherlands – USA
7	Cladan SA	Argentina
8	APSA International	Argentina
9	DSM Nutritional Products Argentina SA	The Netherlands
10	Bioter SA	Argentina
11	Brouwer SA	Argentina
12	Ensolpigs SA	Argentina
13	Bedson SA	Argentina

(Source: Agrivalue SA 2019)

8.6.2 Pharmaceuticals

The main suppliers of pharmaceuticals to the Argentine pig sector are presented in the table below. For more detailed information about these companies please look at the following paragraphs.

Table 47 Main pharmaceutical suppliers

Nr	Company	Origin
1	MSD Salud Animal	USA
2	Laboratorios Calier Argentina	Spain
3	Ceva Salud Animal SRL	France
4	Vetanco	Argentine
5	Vetifarma SA	Argentine
6	Zoetis SRL	USA
7	Eli Lilly Interamericana Inc	USA
8	Biogénisis Bagó	Argentina

(Source: Agrivalue SA)

8.6.3 Technology (pig production and processing equipment suppliers)

There are many technology suppliers dedicated to the Argentine pig production and processing chain. A random selection of suppliers is presented in table 48.

Table 48 Overview of Argentine pig production and processing technology suppliers

Technology supplier	Description of activity
Company name	Farm technology
Silos Cordoba	Swine equipment - www.siloscordoba.com/products/livestock-equipment/swine/
IM Tesio- DLJ Ingeniería	Deep bed kit manufacturers - www.sistemacamaprofunda.com
Timglados Maciel	Constructions and swine equipment - www.tingladosmaciel.com.ar
Proyectos Agroindustriales	Equipment for industrial poultry and pig farms. www.proyectosagroindustriales.com
Textil Calchaquí	Curtains to protect the breeding farms from sun, water, cold and wind, solving the problem of closing lateral openings - www.textilcalchaqui.com.ar
Extrurex	Equipment for pig farms, such as dosatron dispensers for the animal health line, among others. Agents for the swine division of big dutchman.
Termoplast	Since 1997, termoplast is an argentine industry that provides advice, products and installation service to optimize intensive pig farming. Swine equipment www.termoplastweb.com.ar
Productos Modulares	Manufacturer of roofing and cladding systems - www.productosmodulares.com.ar
3k Pig Quality	Designing and implementing hyper-productive farms with cutting-edge technology and specialized advice – www.3kpig.net
Productos Modulares	Manufacturer of roofing and cladding systems - www.productosmodulares.com.ar
3k Pig Quality	Designing and implementing hyper-productive farms with cutting-edge technology and specialized advice – www.3kpig.net
Proyectos Agroindustriales S.A.	Equipment for industrial poultry and pig farms. Until 1992 the company was concentrated on the sales of biological products for the poultry sector, in the same year they started with production of poultry farm equipment and since 2003 they initiated the production of technology for the pig sector and sales of inputs for all kinds of animal farms.
Grupo Gallara	Precast concrete
Rotor Tanques	Plastic tank manufacturer
Hormitec SRL	Precast concrete
Company name	Insemination technology
Genox	Manufactures imports and distributes material and technology for artificial insemination of pigs - genox.negocio.site
El Mundo Porcino	Mundo Porcino offers extensive technical support in all links of the pig production chain, such as genetics, facilities, reproduction and artificial insemination, as well as health and nutrition, through personalized visits to farms, with a team of highly specialized professionals. The company complements its services with the Insemination Division, providing seminal doses, staff training and performing technical audits.

Company name	Manure handling – Biogas-Biomassa
Tratecosa	Supplier of bacteria for effluent treatments.
EnergiaNativa	Biogas facilities
Mercados Renovables SRL	Renewable energy and energy efficiency.
Company name	Feeding technology
Hb Maquinarias	Complete plants producing balanced feed for poultry, pigs, cattle, cats, dogs, fish, rabbits, horses, and others, pelleted and extruded powder of different capacities http://www.hbmaquinariassa.com.ar/
Teyo	Manufacture of grinders, mixers, food processing plants in all capacities leading company in the manufacture of grinders, mixers, food processing plants in all capacities
IM Lambert	Factory of box rotators and hoppers for compound feed
Giuliani Hnos. S.A	Design, production and installation of equipment and facilities for feed and feed by-products elaboration.
Loyto	Manufacture and sale of grinders, grain baggers, vertical mixers, grain crackers and other products.
Agromat	Automatic feeding systems - www.agromatgranjas.com.ar
Argenfeed	Swine equipment - www.agrimix.com.ar
Argenfeeders	Feeding systems for intensive pork production. The company is active within the market since 2010. Argenfeeders has clients in Argentina and Brasil and started production in Spain recently. www.argenfeeders.com.ar
Company name	Processing technology
Metalurgica Ms SRL	Supplier of processing technologies for further processing facilities. Amongst others; cutters, grinders and further processing machines. Meat processing equipment - www.metalurgicams.net
Grantec	High technology equipment for food production. Since 1998 GRANTEC S.A. exclusive representative for Argentina of GSI GROUP in its Agromarau and Cumberland lines for Poultry and AP for Pigs. In 2009 expanded the representation with the Grain harvest line in Argentina. In 2010 GRANTEC S.A. started with the manufacture of products, in line with the need to substitute imports, and thus expand the offer for the domestic market and new external markets. In 2014, it incorporated a new product line for incubation, the Dutch HATCHTECH, being the most innovative incubation line in the world. www.grantecsa.com
Company name	Farm Management Systems
Agriness Argentina SA	Swine farm management systems. A platform for information management of pig production that allows, in an integrated way, the zootechnical, economic management of the food factory, pharmacy and deposit of inputs. Today Agriness goes beyond software. It teaches, through content, courses and consultancies specially developed for the pig production sector on how to use the information to effectively improve productive management. There are 17 years of history, more than 1.9 million sows, increasingly surprising figures and a name that has become a world reference for the sector. www.agriness.com

(Source: Agrivalue SA 2019)

9 ARGENTINE INNOVATIONS

Currently Argentine investigation institutions such as Estación Experimental Agropecuaria del INTA in Anguil and the Faculty of Veterinarian Sciences of the National University of La Pampa (UNLPam) are developing innovation projects⁸⁶ related to Intelligent feeding systems and Genetical improvement focussed mainly on the small and medium sized pig producer.

The objective of the first project is to create smart feeders, which have automated feeders and thus improve the meat production chain within the framework of precision livestock. These feeders are able to evaluate the individual consumption of the animal and the behavior of each. It is based on the automation, development and optimization of intelligent feeding systems, in order to monitor the consumption and individual behavior of sheep and cattle, adaptable to other types of productions. The total amount of the project amounts 1.7 million pesos of which 70% is provided by COFECyT and the remaining 30% by UNLPam.

This project last year received the highest award for Innovation in Agricultural Technologies (CITA), and the members were recognized by Governor Carlos Verna at the opening ceremony of ExpoTecnico 2018, which reinforces the positioning of the province of La Pampa, as an inescapable reference of current precision livestock.

Another project was known as "Mobile breeding center for the improvement of swine genetics of small and medium-sized producers in La Pampa. Dean Abelardo Ferrán together with Sebastián Ramos were responsible for exposing the state of execution of the project that aims to improve the quality of the final product, the productive and socioeconomic indices of primary production, which positively impacts the entire pig chain, improving the profitability of the sector. At national level, pig reproductive biotechnologies are restricted to intensive production systems. On the other hand, this project seeks high merit genetics accessible to small and medium producers.

Large scale operations are also innovating, but more with a sustainable focus. Biogas production, farm management systems and optimization of their production facilities are indicated as focus points. As mentioned before, amongst others companies such as Pacuca, Qualitá and The Good Pig are implementing these sustainable projects.

An area still to be further explored in terms of innovation in Argentina is the deboning of the half carcass. Today only 6 cuts have relative value, while other countries succeed to market almost all.

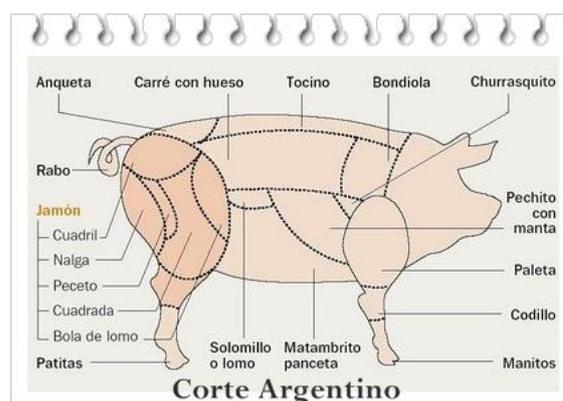


Table 49 Half carcass fresh cuts (%-age of total value)

Cut	Share	Cut	Share	Cut	Share	Cut	Share
Jamon con hueso	25.6%	Paleta con hueso	15.30%	Recortes	2.90%	Unto y grasa	3.72%
Carre con hueso	11.10%	Bondiola para salar	4.35%	Cuero	3.91%	Patitas + manitos	2.35
Pechito con manta	8.7%	Tocino	7.40%	Papada s/c	2.95%	Rabos + anqueta	1.45%
Solomillo	0.75%	Panceta	3.67%	Cabeza	5.85%	Total	100%

(Source: AAPP)

⁸⁶ <https://infopork.com/2012.9/07/proyectos-innovadores-comederos-inteligentes-mejora-genetica-porcina-unidad-de-vinculacion-tecnologica/>

10 INVESTMENT INITIATIVES IN PORK PRODUCTION IN ARGENTINA

In 2016 a total of US\$ 200 million was invested in the Argentine pig production sector. At that time a minimum investment of US\$ 7.000 dollar per sow was required. In 2019 the average minimum investment per sow is estimated between US\$ 8.000 and US\$ 8.500 per sow.

10.1 Bottleneck for investment initiatives

One of the problems that currently discourages new investments in the sector has to do with the impact of Value Added Tax on purchases of fixed assets⁸⁷. Before the tax reform (Law 27430 BO: 29/12/2017) sales of pigs was charged with a 21% Value Added Tax (VAT) rate. A pig farmer sold a pig and received a payment including the 21% VAT, while on its purchases he was charged part 10.5% and part 21% (feed pellets, premix, vaccination , etc.). The salary of personnel , of course, are not reached by this tax. Ultimately, depending on the outcome, the VAT tax position every month was in favour of the tax authorities in relatively considerable numbers.

But as a result of the tax reform, the value added tax rate of pig sales went down from 21% to 10.5% on net sales, so farms will have highly balanced value added tax positions. The aim of this measure was to flatten the prices of meat in the shelf and eliminate informality.

The problem for producers arises when they want to grow, invest and have more sows in production. The estimated investment per sow is between U\$S 8.000 and U\$S 10.000 excluding the required rural property in which to develop activities. In practical terms, the VAT that accrues while investing is equivalent - approximately 17% / 18% on the invested amount due to the combination of national purchases (recorded at 21%) and some imports of capital goods charged in VAT with 10.5%. This means that producers must contribute to the concept of value added tax between U\$S 1.360 and U\$S 1.800 of VAT for each sow they want to incorporate in their farm.

In addition to not having a monthly tax position to recover the VAT paid by the investments, the producers ended up taking this value as cost, with its negative impact on the financial level.

With tax reform (Ley 27430 BO: 12/29/2017) a new regime was put into effect refund this VAT that arises from the investments. But with the condition that the company involved must pay - within 60 months after the received refund an equal to the amount of the refunded VAT. As indicated above, with the decrease of the VAT rate to 10.5% on the final pig sale, today the pig production activity in general does not generate monthly VAT payments (a position in favour of tax authorities) to meet this condition.

As a consequence, the company involved could be required to return to the tax authorities the received VAT in concept of Tax refund on investment plus an additional 3% monthly interest. An important damage. There are business groups that, through this problem, have paralyzed their projects of expansion and incorporation of new sows. It is a theme that demands an urgent solution.

10.2 Associative production models

Given the excellent prospects of swine production in Argentina, the Swine Production Trusts (Fideicomiso Porcino), which bring together investors interested in boosting their savings, are growing. An example is the Argentine Livestock Trust (Figan): it has 220 sows, 3.000 animals in stock, its own balanced feed plant, reach the public directly with four direct outlets located in the province of Santa Fe and project the construction of a refrigerator that will demand an investment of US\$ 50

⁸⁷ Source: Julio Calzada-Federico Di Yenno-Carina Frattini-BCR

million. Currently, this pig trust has 100 trustors (investors) active within its scheme, and the vast majority do not have any relationship with the agricultural sector but are investors who seek to make the most of their savings. To enter Figan, the initial amount is US\$ 20.000.

Another example of an innovative financing model is that carried out by the BDL company. His project will be based in the Cordoba town of Noetinger, where the company will invest US\$ 45 million. In 2018 they started with an associative business model, which brings together intensive pig production and cereal producers. The pigs will be delivered to the agricultural producers who will use their grains for food in the growth stage that, with an investment according to their possibilities, so they will access the highest level of productivity. From the company they estimate to achieve a production per year of 150.000 heads, which represents 2.5% of the national annual production.

10.3 Circular economy investments

An example of a company with investment in circular economy is Pacuca SA (see also paragraph 8.3.3). Pacuca invested US\$ 6 million in circular economy, 60% financed through the Bice bank and the rest from own capital and a local bank. Pacuca will be generating electricity from animal waste. Pacuca, is building 3 bio digesters for the generation of electrical energy from animal waste. With this investment, the company will be able to generate 8.000 megabytes per year to introduce them into the network within the framework of round 2 of the RenovAr Program. This results in the of supply electric power to 3.000 families. Currently the company is making the base of the bio digesters and the objective is that in a year the plant is in function.

Image 33 Construction of the biodigestors of Pacuca



(Source: Pacuca SA)

11 THE DUTCH PIG SECTOR⁸⁸

Chapter 11 supplies you with an overview of the latest data and developments within the Dutch pig sector based on a summary of information published by the Rabobank, Pig Progress, Agrofood Portal and the Wageningen University amongst others.

The Dutch industry has played an important role in setting new standards for pig production around the globe. In order to keep this leading role, the Dutch pig sector has to deal with many threats and challenges.

11.1 Primary production

Pig farming in the Netherlands is considered one of the most advanced in the world. On a limited surface even smaller than many Argentine provinces almost 17 million people as well as over 12 million pigs live. This scarcity of space and a critical population have led to an innovative industry, which steered the country to be amongst the first to discuss themes like antibiotics usage, stocking density, air quality and biosecurity.

Animal welfare is also an ongoing topic. Together with welfare organisations, the Dutch livestock chain has set up a quality control system, marking meat in retail shops with 1, 2 or 3 stars, depending on the quality of life an animal had during its life. Premium animal products, be it pork, beef, poultry or eggs, are sold against higher prices.

11.2 Economic value of the Dutch pig sector

The Dutch pig farming sector employs over 26.000 people (slaughterhouses, stable builders, feed companies, breeding organizations, etc.) and has an economic value of over € 8 billion euros representing 1,5% of the total economy and an export value of € 5 billion.

The Netherlands is over 250% self-sufficient for pork and therefore has to export more than half of its production, making the country extra dependent on the economic conditions of foreign markets both in the EU and elsewhere.

Table 50 Dutch pig sector in numbers

Sector reference	Number
Workforce	26.000 persons
Economic value	€ 8 billion (1.5% of Dutch GDP)
Number of farms	4.300
Number of pig houses	16.550
Size of the farms	More than 7.500 fattening pigs (7%), More than 1.200 breeding sows (7%)

(Source: Agrivalve SA based on Rabobank data)

11.3 Dutch pig farm structure

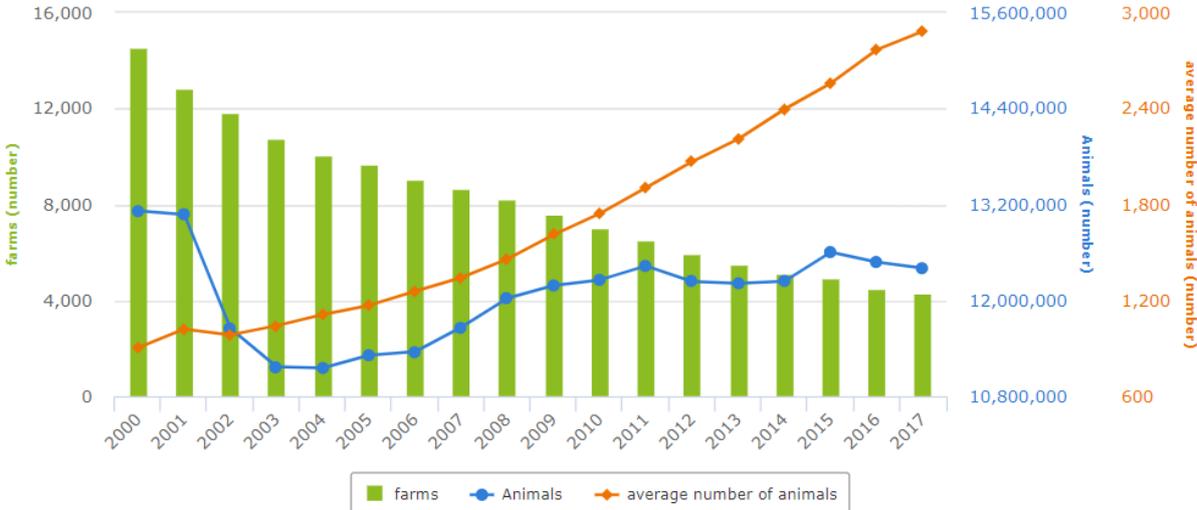
In the Netherlands there are 4.300 pig farms and 16.550 pig houses. In the Netherlands specialized companies in pig farming generally have a larger livestock. Only 326 of these are farms with more than 7.500 fattening pigs or more than 1.200 breeding sows (7%). Respectively 89 farms have more than 7.500 fattening pigs and 237 have more than 1.200 sows.

⁸⁸ Rabobank, Pig Progress, Agrofood Portal, WUR amongst others

The number of pig farms is decreasing annually, partly due to no follow-up and lack of development prospects. From 14.500 pig farms in 2000 to 4.300 in 2017, a decrease of 70% in 17 years. However, companies have grown; from an average of 903 animals to 2.883 in 2017.

The Netherlands has 12.4 million pigs. The pig population consists of breeding pigs (sows and bears - > more than 1 million), piglets at the sow (approximately 2.2 million), young pigs up to 50 kilos (5.2 million) and fattening pigs (3.9 million). That number has been stable for a longer period of time now, according to a fact sheet of the Union of Dutch Pig Producers (NVV). However, the number of pig farms has decreased rapidly from over 14.000 in 2000 to just over 5.000 now.

Graph 44 Number of pig farms, number of animals and animals per farm



(Source: CBS-landbouwtelling, WER)

The main reason of this significant reduction is a lack of successors, since children of pig farmers like to choose a career outside the sector. Other farms disappear because a planned expansion or modernising of the premises meet too many hurdles or because of financial difficulties. The total number of pigs hasn't decreased to the same degree, because the surviving farms have more animals, with an average herd size of approximately 2.500 pigs now compared to just 900 in 2000.

11.4 Geographical distribution of pig farming in the Netherlands

The highest concentration of pig population can be found in the south of The Netherlands. The main reason of the high population of pigs in Noord-Brabant, Limburg and Gelderland is that these areas have sandy soils. The poor quality of the land in these areas does not lend itself to large-scale land-based activities, such as agriculture or dairy farming. In addition, these areas traditionally have been well positioned for large consumption areas (Ruhr area, Paris), favorable transport infrastructure, high level of education, efficient knowledge exchange, and well-trained workforce.

All of these factors combined with limited availability of land, resulting in high land prices, encouraged more intensive keeping of animals and therefore higher production per unit area.

Table 51 Geographical overview of pig population in The Netherlands

N°	Province	Total	N°	Province	Total
1.	Noord-Brabant	5.950.727	7.	Groningen	162.849
2.	Limburg	1.937.689	8.	Zuid-Holland	120.551
3.	Gelderland	1.923.940	9.	Friesland	106.387
4.	Overijssel	1.627.010	10.	Flevoland	52.980
5.	Drenthe	262.860	11.	Zeeland	59.074
6.	Utrecht	252.425	12.	Noord-Holland	22.102



11.5 Dutch productivity figures

In 2018 the Dutch pig production sector became even more productive by reaching a higher sow productivity of 29.2 weaned piglets per sow per year compared to 22.1 piglets in 2002.

Graph 45 Development of productive indicators (number of weaned piglets per sow per year)



(Source: agrofoodportal.com – bedrijveninformatienet)

The growth rate per animal per day increased and the feed conversion ratio improved as can be observed in graph 46.

Graph 46 Pig fattening growth rate (grams per day) and feed conversion (kg feed per kg growth)

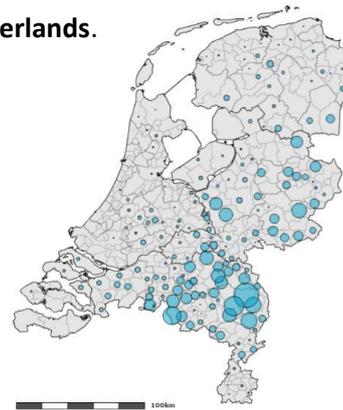


(Source: agrofoodportal.com – bedrijveninformatienet)

11.6 Processing and meat production

Table 52 Geographical overview slaughterhouses in The Netherlands.

N°	Province	Total	N°	Province	Total
1.	Noord-Brabant	1.632	7.	Drenthe	100
2.	Gelderland	1.062	8.	Groningen	77
3.	Overijssel	726	9.	Friesland	51
4.	Limburg	448	10.	Noord-Holland	37
5.	Utrecht	203	11.	Zeeland	37
6.	Zuid-Holland	105	12.	Flevoland	30



15.7 million pigs were slaughtered in 2018 an increase of 5% compared to the previous year (14.9 million pigs in 2017).

In 2018, more than 3.6 million kilos of meat was produced in The Netherlands, of which 40% concerned pig meat (1.45 million ton). Within the EU, the Netherlands has a market share of around 8% in pork production.

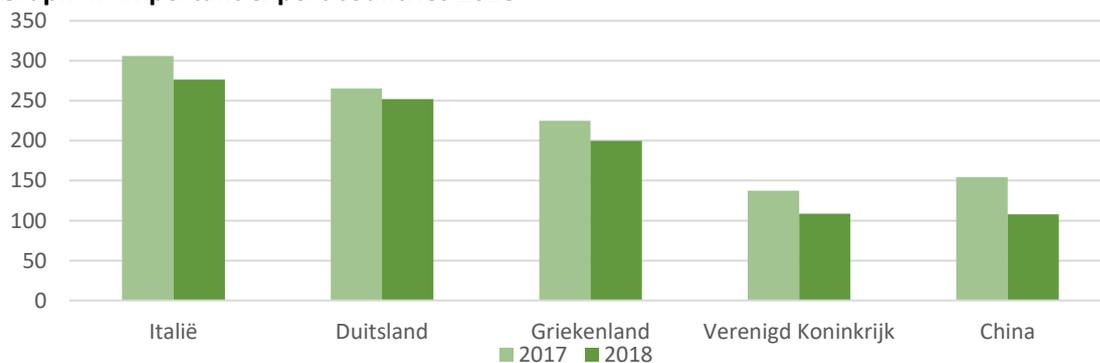
11.7 Consumption

On average, 76.6 kilograms of meat is consumed per person per year in the Netherlands. Pork is the most popular (36,5 kilograms per person per year), followed by poultry (22,1 kg), beef (15,4 kg), veal (1,3 kg), sheep and goat meat (1,2 kg) and horse meat (0,1 kg). The actual meat consumption is around 38 kilos per capita. The actual pork consumption is around 20 kilos. The Dutch mainly eat pork chops, bacon, sausage and filet. Dutch people often opt for pork because it is tasty, healthy and affordable.

11.8 Dutch Trade

The value of pork exports increased from € 1.5 billion in 2010 to € 1.9 billion in 2017. In 2018, the export value fell for the first time in years as a result of lower prices for pigs and especially lower piglet prices to € 1.8 billion. Germany imported 14% (€ 252 million) and 58% (€ 1 billion) was exported to other EU countries. In addition, more than a quarter of the export value goes to destinations outside the EU. The sector exports both piglets and pork meat. Piglet exports rose again in 2018 with 2.4% (6.6 million) and pork meat with 0.8% (3.5 million).

Graph 47 important export countries 2018

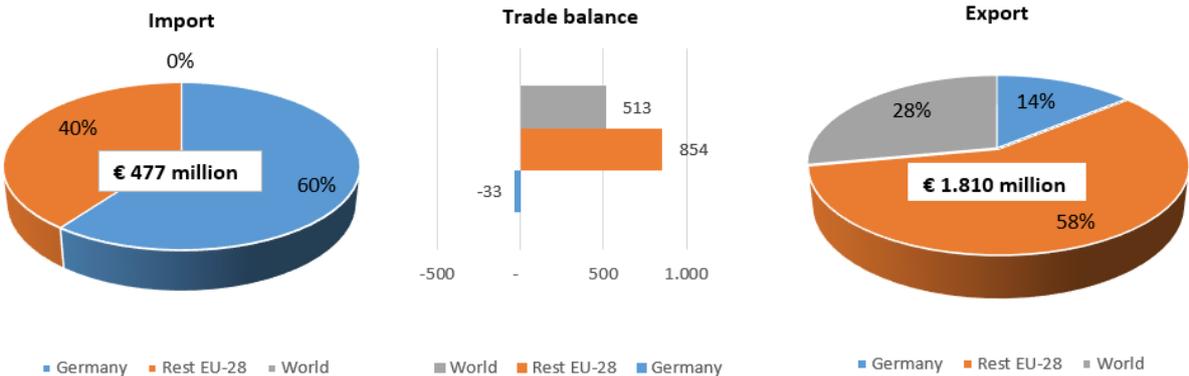


(Source: Agrivalue SA based on WUR data)

The total imports in 2018 had a value of 477 million euros, of which 60% (285 million euros) originated from Germany. Germany, the largest producer within the EU, is an important trading partner for the Netherlands.

The Netherlands is a trading country with a lot of exports, but also has imports. Part of the export is so-called re-export: 8% of the export relates to imported pork that is re-exported after any processing. The vast majority (92%) of total exports are pork produced in the Netherlands.

Graph 48 Import and export of pork meat of the Netherlands 2018



(Source: Agrivalue SA based on data WUR)

11.9 Action Plan Revitalising Dutch Pig farming

Over the last few years, the Dutch sector has lost its edge, leading to less profitability, a high debt burden and other problems. The pig sector also blames the government’s gold-plating of EU regulation, in particular for animal welfare and environment. Last but not least, the intensive pig industry produces a large amount of manure which is costly to remove and process.

A group of experts from the pig industry, the Dutch government and Rabobank under the chairmanship of Prof Dr Uri Rosenthal, a former foreign secretary have put together an Action Plan to Revitalise Pig Farming in the Netherlands. For the newly erected ‘Dutch Association of Pig Farmers’ (POV), the aim is to save an industry which has been in crisis for quite some time.

According to the plan structural changes are needed to strengthen the position of pig farmers in the Netherlands and to offer all players in the Dutch pig industry, from feed and genetics to retail, a viable future. Of the existing 5.000 pig holders, only some 2.000 can survive.

Dutch pig farmers have to start to produce what the market requires, seek more cooperation and enter into contracts with the companies that process their animals and market the meat.

11.10 Economics of pig farming in the Netherlands

11.10.1 Cost price

The Dutch pig farmer has a cost of 1.53 euros per kilo of carcass delivered. Assuming a pig of 120 kilos, this means an investment of 183 euros per pig. The 1.53 euro cost price includes 19 cents in costs to meet social requirements, such as animal welfare and environmental requirements. The cost price position of the Netherlands compared to other important "pig countries" in Europe have clearly deteriorated since 2012.

The Netherlands has the highest costs for Europe's social demands. In concrete terms, this means: Dutch pig farmers pay 300 million euros each year to comply with all welfare and environmental laws. That is on average 67.500 euros per pig farm. For comparison: An average income in the Netherlands is around 36.500 euros. A pig farmer in the Netherlands therefore spends almost two average incomes each year, alone on costs to meet the statutory social requirements that apply in the Netherlands.

Environmental costs:

The costs for depositing manure are the highest (9 cents). In other major European pig countries, these costs are only 1 to 4 cents. Costs for limiting odor, ammonia and particulate matter emissions are also around 3.5 cents higher in the Netherlands than in other countries.

Animal welfare costs:

The surface requirement for meat pigs in the Netherlands lead to a cost increase of up to 1.5 cents per kg. The required living space per meat pig in the Netherlands is 0.8 m² per meat pig. Sows that are pregnant for the first time must be housed in the Netherlands on the same surface area of 2.25 m² as the other bearing sows, while according to the EU directive that only needs to be 1.64 m². In addition, the sows in the Netherlands must already be in the group 4 days after insemination. In other EU countries after 28 days.

Feed costs:

European pig farmers have 1 to 2 cents more feed costs per kilo of pork compared to pig farmers outside the EU. This is because the EU bans genetically modified raw materials and animal meal in animal feed, which cannot be used since the BSE crisis.

Spatial planning costs:

Due to limited availability, these costs are higher in the Netherlands than other European countries.

The Action Plan⁸⁹ mentioned in paragraph 11.9 signals that the pig farmer is the only player in the whole chain who has a negative return-on-investment. Implementation of the plan should lead to a yield of 6-8% in 2020: "It's not a question of: producing more or less, it's a question of: producing better and differently."

That means at least four things:

- Better meeting the changing demands of consumers;
- A more sustainable production;
- A solution for the many empty pig houses in the country; and
- Causing less nuisance for the surrounding area, an increasingly difficult problem in a small and densely populated country like the Netherlands.

In order to meet those challenges, pig farmers should cooperate more with each other. Collectives have to focus on improving their market position, working closely together with other partners in the chain based on existing quality guarantee systems like a Chain Quality System (CQS) called 'Holland Varken' (Dutch Pork). This will enable the farmers to respond better to consumer demands both in the Netherlands and abroad. Guaranteed quality, diversity, distinctiveness and continuity are the key concepts.

⁸⁹ <https://www.pigprogress.net/Piglets/Articles/2016/7/The-Netherlands-Innovation-needed-in-pig-sector-2841652W/> Jul 22, 2016 by Ruud Peijs

Other cooperative organisations can focus on processing and adding value to manure. The Action Plan states: “It is necessary to significantly lower the marketing costs of manure. Pig farmers must take the lead and aim for complete manure processing”.

In order to improve the image of the sector’s positive features, the safe and innovative production methods, and the quality of Dutch pork will be emphasised in information and promotion campaigns aimed at stakeholders, partners, buyers and end consumers. Dutch pork will be distinctively positioned as a reliable, high-quality product. This will create a more positive image of the sector in general, both among stakeholders and consumers in the Netherlands and abroad.”

This all should lead to a drastic improvement of the financial position for pig farmers. The Action Plan: “Together with the chain partners, a balanced revenue model will be developed whereby customers are prepared to pay a fair price for a good product.”

In 2018 more than 74% of the the primary production cost structure of sow, pig, fattening or integrated farms were direct costs, followed by tangible assets.

Table 53 Estimated primary production costs Dutch pig farmers in 2018 (in Euro)

Cost item	Sow farm		Pig farm		Fattening farm		Integrated farm	
Other	31.300	3%	31.300	3%	20.200	3%	47.600	3%
Finance costs	26.700	3%	26.700	3%	17.200	3%	44.900	3%
Contractors	4.500	0%	4.500	0%	3.400	1%	8.000	1%
Paid labour	35.400	4%	35.400	4%	5.100	1%	58.300	4%
Tangible assets	121.200	13%	121.200	13%	744.00	12%	196.900	13%
Energy costs	24.700	3%	24.700	3%	128.000	2%	40.300	1%
Direct costs	688.300	74%	688.300	74%	4.777.000	78%	1.072.200	74%

Graph 49 and 50 show how the considerably lower selling prices for piglets and fattening pigs and the increase of feed prices the incomes on pig farms became strongly negative.

Graph 49 Development of some prices (excl. VAT)



(Source: agrofoodportal.com – bedrijveninformatienet)

Graph 50 Family pig farm income per unpaid annual working unit



(Source: agrofoodportal.com – bedrijveninformatienet)

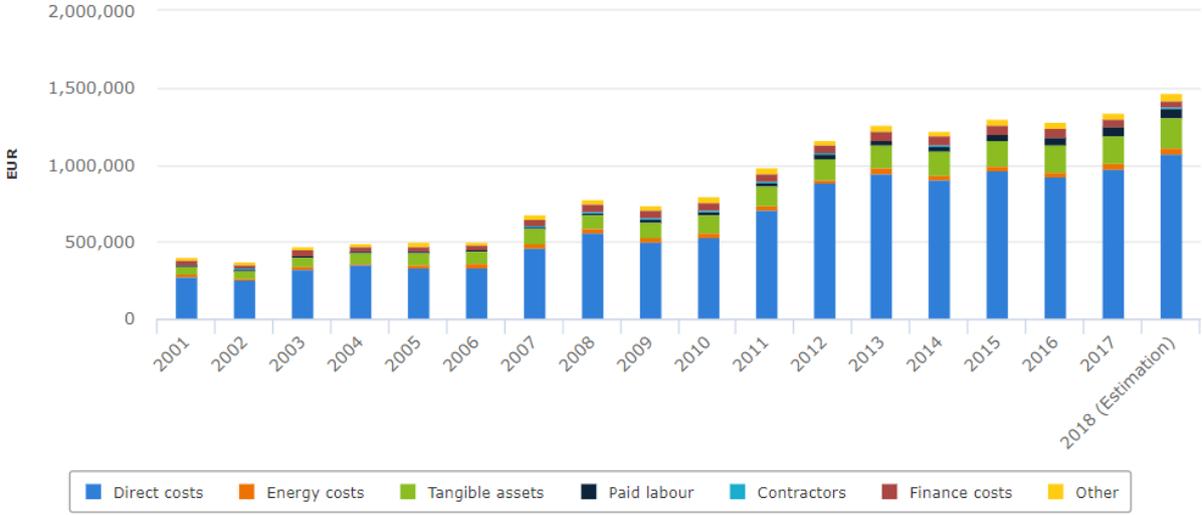
Higher costs due to higher prices for feed and manure removal lead to a reduction of the Dutch pig inventory.

Graph 51 Development of average total cost per sow farm



(Source: agrofoodportal.com – bedrijveninformatienet)

Graph 52 Estimated cost overview Dutch intergrated pig farms



Graph 53 Estimated cost overview Dutch pig farms



11.10.2 Profitability

The price of products plays a major role in fluctuating income between years. Dutch pig farmers came out of a deep trough in 2016 after a major financial crisis, particularly in 2014 and 2015. Due to higher prices of both piglets and fattening pigs and lower feed prices, incomes increased in 2016 and 2017, to decline again in 2018 to almost 90.000 euros per unpaid annual labor unit.

11.10.3 Financing

A Sustainability and Quality Fund will be set up by Rabobank and the POV to enable pig farmers to finance changes to their production methods in line with the above-mentioned action plan. Besides, Rabobank and POV will also start a so-called ‘Pig Production Revitalisation Company’, which will be open for other parties to join. Its task is to assist owners of viable companies to further develop their business but also to close down businesses with poor future prospects.

11.11 Circular economy

One of the focus points of the Dutch Minister of Agriculture for 2030 is the circular economy. Already today the Dutch pig is an ultimate “recycle” animal. There are hardly any other countries in the world where a food industry contributes and valorises larger volumes of by-products than the Dutch food industry⁹⁰. No less than two-thirds (65%) of all pig feed in the Netherlands would contain food remains (side-streams of food industries).

To be able to further increase the share of effective side-stream processing, Dutch legislation needs to be adjusted. For example, under strict conditions regarding food safety and public health, the return of animal-meal to animal feed should become possible in order to close the cycle even better. Animal meal (from ground bones) has been forbidden to be used in animal feed since the BSE crisis. Animal fats may still be used.

Pig Business made an inventory of what Dutch pigs eat from side-streams or by-products from the food industry and thus process them in a sustainable way:

Table 54 Side-streams of the food industry (vegetable and animal origin) for pig feed

Vegetable origin	
Soya meal and skins:	Remain after pressing soybeans into oil. The oil is used in many foods and personal care products and for bioethanol.
Soymilk:	Arises from the processing of soybeans into various food drinks for human consumption
Rapeseed flakes and scrap:	Remain after production of rapeseed oil
Palm oil scrap:	Is released during the production of palm oil, which is used in chocolate paste, peanut butter and meat substitutes, ao.
Palm kernel flakes:	Chicory pulp - created during the extraction of inulin and sweetener from chicory roots
Groats:	Arises from the production of bread flour and pasta
Beet pulp:	Remains after sugar production
Molasses:	Stubby liquid from sugar production
Wheat starch:	Remains after production bread and pasta
Steam peels:	Remains from production fries or shelled potatoes
Pre-fried fries:	Is released during sorting and when starting up and running the packaging lines.
Bread, cookies, fries, candy bars, mashed potatoes, potato croquettes:	Have (almost) reached the expiry date or are different in shape and taste, as a result of which they can no longer be sold as food.
Corn flour	Is released during the production of maize semolina and maize flour for breweries and the food industry
Beer:	Beer broth, beer yeast and beer flakes are released when brewing beer
Beer barley:	Brewing barley that is not due to strict controls for beer production
Barley:	Remains of barley from a previous harvest season
Flaxseed flakes:	Co-product of the extraction of oil from flax seed
Root:	Carrot steam peels come from the canning industry. Carrots are stripped of their peel with the aid of steam.
Sunflower seed scraps:	Arises from the production of sunflower oil

⁹⁰ Pig Business (2019)

Animal origin	
Chicken fat:	Is released during chicken meat production
Cheese trimmings:	Remains with cheese production
Cheese whey:	From the cheese-producing dairy industry. Contains all soluble components that do not end up in the solid cheese dust or curd.
Glucose:	Arises from the extraction and processing of lactose from cheese whey
Butter - Butter serum (or butter milk):	A moist dairy product that is released during the production of butter oil from butter
Milk, yogurt, cottage cheese, custard:	Lactic acid that remains from dairy production
Grown directly as animal feed:	Corn, wheat, soy

(Source: Agrivalue SA based on Pig Business 2019)

11.12 Animal health, welfare and sustainability

In the Netherlands there are various public-private initiatives that focus on sustainable production, animal health and welfare. Two of them are Vitale Varkens (Vital pigs) and Keten Duurzaam Varkensvlees (Sustainable Pork Chain).

11.12.1 Vitale varkens⁹¹

The agricultural business community has taken the initiative to set up the Research Agenda for Pig Farming together with the Ministry of Agriculture, Nature and Food Quality (LNV) and to provide funding.

The sector believes it is important that the results of this research are shared and applied by pig farmers. In addition, the sector wants to inform everyone who is interested in the progress that pig farming is making. The website www.vitalevarkens.nl is one of the ways to distribute this information.

Vitale varkens (Vital pigs) is an initiative of POV, VBV, Topigs Norsvin, PIC, Next Genetix, KNMvD, Nevedi, V&LN, COV, PIVV and the Dutch Organisation for Animal Protection.

Vital pigs are the basis for healthy pig farming. Dutch pig farming is constantly working on improving the health and welfare of pigs. Better pig feed, renewal in housing and farming, improvement of the stable climate and fewer interventions. In addition, pig farmers are increasingly making use of innovations by collecting data with which they can respond even more alert to the health of their animals and guarantee food safety.

Pig farming has a number of societal challenges that it faces on a daily basis and that pig farmers want to respond to. Among other things by converting these challenges into practical and achievable steps. Some of these societal challenges are anchored in the Research Agenda Pig farming:

big vitality, intact tails, stopping castration, less use of antibiotics and effective data and information flows.

Scientists, the business community and pig farmers themselves work together within the research agenda and do research into this. With the aim of being able to further improve the welfare and health of pigs on farms as a pig farm.

⁹¹ <https://www.vitalevarkens.nl/vitale-varkens-/wat-zijn-vitale-varkens>

Through the website www.vitalevarkens.nl the sector shows which social issues are dealt with, how pig farmers do this at their own farms, what they encounter and what results they achieve. If you want to see this with your own eyes, you have the opportunity to visit a pig farm yourself.

www.biovarken.nl www.topignorsvin.nl www.pic-nl.com www.nextgenetix.nl
www.knmvd.nl www.nevedi.nl www.vee-logistiek.nl www.pov.nl
www.cov.nl www.dierenbescherming.nl

11.12.2 Sustainable Pork Value Chain Association⁹²

Sustainable Pork Value Chain Association (Keten Duurzaam Varkensvlees) is a cooperative venture between Dutch pig farmers, slaughterhouses, wholesalers, butchers, cold meat producers, retailers and caterers. The association doesn't just set standards for their partners, but also helps them meet their strict standards on animal welfare and the environment. Together with the farmers, they bring innovations into their farms that they would not have been able to implement on their own.

The cooperative examines where there's room for improvement, test innovations, and works together achieving energy-neutral pig farming, and putting healthy and tasty meat on your plate.

The participants believe in sustainable meat, this means having respect for the environment and the animal. They see it as their mission to enable awareness among consumers concerning sustainable choices by proactively encouraging and facilitating developments in farming. And by bringing consumers, chefs and butchers together. They believe in healthy animals, energy-neutral pig farming, a better life for the pigs, and meat with the best taste.

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3401 MZ IJsselstein
The Netherlands
info@duurzaamvarkensvlees.nl
Tel: +31 (0)30 760 7900



⁹² <https://sustainable-pork.com>

12 CHALLENGES AND OPPORTUNITIES

12.1 SWOT ANALYSIS

Table 55 below shows the results of the analysis of strengths, weaknesses, opportunities and threats, which will serve to define strategies to enhance the strengths and opportunities and mitigate the weaknesses and threats that the Argentine pig production and processing sector brings.

Table 55 SWOT analysis Argentine pig production and processing chain

Internal	
Strengths	Weaknesses
Growth of local demand	Brand ignorance
Modern genetics is available	Production cycle greater than that of poultry meat
Shorter production cycle than beef	Disease generation
Available feed supply suitable for pigs	Cheaper substitute products
Environmental viability	High dependence on corn
First export consortiums are created	Withholding of retentions to the agricultural sector
No limitation in local consumption growth as there are almost no local beliefs or traditions, including religion that ban pork consumption	Lack of experience within the international pork market.. Consumer habits vary from country to country, market and price knowledge are required to guarantee the highest value of the products
The Argentine pig sector has recently shown it has the capacity to grow considerably within a short period	The scales of the establishments, as well as the levels of primary and industrial productivity, are lower than the main exporters in the region
Large scale operations can be initiated without impacting the environment	The low levels of pork production in the local pig processing sector is not enabling the development of a metallurgical industry providing capital goods
Relatively no limiting government zoning and/or land use laws	Equipment available on the local market for the slaughter industry isn't of good quality
The ability to deal with manure or other outputs from the pig operation	Several of the (small) refrigeration plants are working with obsolete equipment
Local and global market conditions and demand are promising	There are difficulties for the installation of effluent treatment plants at affordable costs for SMEs.
The country is free of local diseases or conditions that affect pig growth	Organization and vertical coordination of the chain, poor links with State Science and Technology agencies and low use of promotion tools.
Product quality has improved considerably	Insufficient critical mass of professional offer to attend the processing establishments, and a low level of professional assistance to the plants.
Availability of water	Lack of availability in the local market of some essential inputs(additives) for the chacinados industry.
First private trust funds for pig production are established	The implementation of quality systems that guarantee safe handling in all links and traceability of pork, as well as the control of "off-the-record-operations" ⁹³
	Insufficient production of quality raw materials to satisfy industrial demand in time and form, with little insertion in the export market and lack of added value
	In most of the world's agribusiness-based nations, growth is carried out with long-term financial support, a condition that is not present in Argentina

⁹³ https://inta.gob.ar/sites/default/files/doc_2-_ analisis _prospectivo.pdf

External	
Opportunities	Threats
Opening of new credits to the industry	Raw material price increase (Corn)
Record consumption of pork per capita	Increase in importation (Brazil)
Internal demand unsatisfied	Political instability.
Possibility of vertical integration	Restrictive policies for the sector
Favorable weather	Devaluation of the peso.
Easy access to basic supplies.	Emergence of new technologies.
Trade opportunity for Latin America, as countries such as Argentina, Brazil and Chile prepare to increase or establish exports thanks to African Swine Fever (ASF) is decimating China's pork industry	Concerns about scaling-up production in an industry that has poor environmental standards and an unimpressive record on animal welfare.
Increase in the price of other meats (beef and poultry).	USD based production costs increase and stagnating sales value increases 94
Access to world markets. New free trade agreements and bilateral agreements between countries will stimulate the further expansion of trade and therefore also the choice of the number of destinations ⁹⁵	Rising disease pressures are challenging the global market. "African swine fever (ASF) stands out as the single biggest challenge facing global pork in 2019
Entering into a structural collaboration with chain partners. Through structural cooperation and making agreements on, for example, quality, sales channels and product specification, it is possible to respond better to customer demand. The above factors can help to better suppress price volatility.	The outbreak of disease brings restrictions on trade from the affected country, in order to manage the risks of the disease spreading.
High consumption of pig meat in developed countries, shows potential growth within the local market	Potential closure of / and or restrictions, on the import of capital goods (production and processing technology)
Sufficient company size is necessary to be able to supply large customers on a regular basis and to be able to load and deliver full containers quickly. Argentina has operations with more than 5.000 sows and even up to 12.000 sows.	Further devaluation of the peso will make it even harder to invest in the pork production chain, especially for those companies that are selling their product on the local market
Buyers increase their quality requirements. They define their own product specifications, depending on the purpose for which they want to use the products. Argentina has the opportunity to diversify according to the product-market combinations (PMC).	Brazil is a major threat due to its enormous production potential and its current installed capacity to process and export.
Swine Production Trusts	
Add value to cereals and agricultural production producing meat at origin	
China's need to lift imports will incentivise continued growth of the sector	

(Source: Agrivalve SA)

⁹⁴ <https://observatoriorural.com.ar/2019/02/08/casi-cuatro-mil-productores-porcinos-menos-en-buenos-aires/>

⁹⁵ Rabobank Research Pork Quarterly Q1 2019: Another Uncertain Year – With More Complex Disease and Trade Issues by Chenjun Pan, Senior Analyst – Animal Protein

12.2 Opportunities for Dutch - Argentine cooperation

The Dutch and Argentine pig sector can work together and interchange information, knowledge, know-how and technology within almost every aspect of the pig production chain. Interviews with various stakeholders within the sector mentioned the following subjects as main priority:

- ✓ Genetics, but the main international players are present within the market
- ✓ Facilities (feeding systems)
- ✓ Design
- ✓ Farm Management equipment
- ✓ Management software
- ✓ Nutrition specialized in piglets
- ✓ Specific raw materials
- ✓ Financing for growth projects
- ✓ Joint development in new markets
- ✓ Sustainability and animal welfare projects
- ✓ Slaughterhouse technology (deboning, packing equipment)
- ✓ Cold store capacity

13 CONCLUSION & RECOMMENDATIONS

The Argentine pig sector is booming: production, consumption and exports grew⁹⁶. The pig production chain has been experiencing significant growth over the past few years, and there is a high chance of increasing domestic consumption and replacing imports.

Argentina is the only country in the world that exports about 60% of the feed grains it produces and 90% of soybeans (source of energy and protein, respectively) instead of transforming them to added value products. Argentina only processes 10% of the grain it produces; United States, 70%.

Argentina has all the conditions to be a successful player within the global pig market. As important as the international market, the pig activity also means adding value and generation of additional employment to grain production within the local market.

Argentina has land, water and a critical mass of people with high technical and professional level. It also has a culture of high consumption of animal proteins. These factors suggest that Argentine pig production will maintain the trend of growth marked in the last 10 years.

The global pork sector outlook shows scenarios indicating that only the countries with the ability to be self-supportive in grain supply and with access to enough potable water reserves will be able to compete on the international animal protein market. Argentina is one of those nations that meet these requirements. While the pig farmers in the Netherlands are located within less productive arable areas, the Argentine pig farmers are located within the most fertile areas.

Local policies stimulating alternative meat consumption can be seen as an opportunity for the development and consolidation of the local pig production sector, with special focus on the versatility of pork, its low-fat content and innocuousness⁹⁷.

The opening of the Chinese market and the additional demand created thanks to the impact of the ASF crisis generate a whole new panorama full of interesting challenges. With this context of opportunity, Argentina can be considered an ideal country to produce pig meat. Argentina⁹⁸ has 0.16 pig heads per cultivable hectare vs. 2.4 in Europe and 6.2 in China. Argentina has an optimal sanitary status and does not use hormones in animal production, a strong argument before demanding consumers.

With Argentine slaughter growing at a rate of 10% per year, the country has many development opportunities to reemplace imports and be self-sufficient. Exports will also grow, but are still of limited scale within the global export market. Clients are found in Russia, Hong Kong, Angola, Ghana, Ivory Coast and lately also in China, markets mainly focussed on volume.

To be prepared for the growing (inter)national demand for Argentine pork the country will have to invest in sustainable primary production, the main pig producing companies are already familiar with European production standards, while new players in the market are seeking for the incorporation of state-of-the-art technology, including first class genetics, management systems, farm technology and

⁹⁶ Clarín Rural especial para Los Andes, FINCAS Lunes, 24 de junio de 2019 by Esteban Fuentes <https://www.losandes.com.ar/article/view?slug=el-sector-porcino-en-pleno-auge-crecieron-la-produccion-el-consumo-y-las-exportaciones>

⁹⁷ <https://www.bcr.com.ar/es/mercados/investigacion-y-desarrollo/informativo-semanal/noticias-informativo-semanal/radiografia-de-Julio-Calzada-Federico-Di-Yenno-Carina-Frattini-BCR>

⁹⁸ “produccion-porcina-ante-una-oportunidad-historica-por-la-explasion-de-la-demanda-nid” by Carlos Marin Moreno (La Nacion) August 2019

are interested in auto-generation of energy, such as for instance of biogas. The processing industry Argentina is looking to expand its slaughtercapacity, wants to invest in deboning facilities to better attend the specific requirements in the world market, add cold store capacity and takes into consideration environmental-friendly solutions for waste stream management.

Table 56 Argentine Pork Sector Analysis

Status	Analysis Pork Sector
Social-economic situation	<ul style="list-style-type: none"> • Traditionally pork is consumed relatively little in Argentina. For this reason, until recently it was mostly used for further processing (cold cuts, sausages). • The improvement of the quality, presentation and image of pork thanks to investment in genetics, improvements of nutrition and sectorial marketing approach made it possible to change the mind-set of the local consumer and reach incredible (fresh) consumption growth figures • It is a sector that requires little geographical extension and low use of inputs for the start of activity in case of the extensive and semi-intensive systems, but the professional intensive production systems are demanding considerable investment of more than U\$S 8.000 per sow. • The pig sector has a social importance for the country due to the absorption of intensive labour, since it retains artisanal work, while incorporating technology. • 95% of companies are SMEs giving an environment of healthy competition and excellent distribution of the labour used. These companies do not play a role within the international playing field • It is a characteristic of the sector that at all levels companies are multi-product, with few exceptions. • The geographical location of the production coincides with the distribution of coarse-grained cereals and whey of the dairy industry.
Technological situation	<ul style="list-style-type: none"> • During the last years many technological investments have been made in both primary production and in the processing industry • Important genetic advances in recent years took place. • New technologies applied in the primary activity as well as the contribution of genetics allowed to improve the conversion levels, the quality of the finished animal and the final product (higher lean content)

Technological Requirements	
Plant and animal breeding technologies	Increase investment in genetics.
	Optimize physical analysis of the meat to achieve an adequate lean / tender relationship from genetic origins.
Primary production technologies	Improve production facilities for sustainable animal development
	Introduce farm management information systems and automated feed control. Stimulate the use of food industry sidestreams.
	Improve effluent treatment with maximum waste utilization.
Processing Technologies	Improve the average quality of the slaughter of the pigs
	Investigate the flavoring of meats in the vacuum packaging system.
	Improve the qualitative stability of the meat in the distribution system
	Development of new sausages and cold cuts with higher added value.

R&D suggestions

- Development of swine genetics
- Promote the analysis of meat and cold management to achieve a higher quality product (tenderness and low fat content)
- Development of packaging technology
- Introduction of management technology
- Investigate and recommend how to optimize waste management both in primary production level, at the slaughterhouse and further processor
- Development and implementation of scientific, technological and digital tools.
- Research in health, genetics and nutrition of pigs.
- Make optimal use of food industry sidestreams

Marketing and promotion suggestions

- The National Government is demonstrating a strong commitment to promoting the consumption of pork together with eight private institutions, a campaign focused on the consumption of fresh meat.
- Argentina still has an interesting gap to close when taking into consideration the pork consumption levels in other countries.
- For the future it might be interesting to take into consideration concept focussed on sustainability, circular economy, animal welfare and health in order to obtain a quality brand position within the world market, like it already has for beef. But first Argentina will have to try to position itself as a reliable supplier of pork. Europe is still price and quality, while China for now is volume, but growing in demand for quality cuts.

Health and animal welfare in pig production

- Argentina is officially declared free of Classical Swine Plague (PPC) on which it has been working for many years. It is of utmost importance that the country maintains this status and valorizes it within the world market.

Financing

- For the breeding and production of pigs in Argentina
- For the installation of slaughtercapacity and coldstores

(Source: Agrivalue SA)

14 DUTCH BUSINESS SUPPORT INSTRUMENTS

For further promotion and strengthening of economic relations, the following Dutch trade instruments are offered in Argentina:

14.1 Business Partner Scan (BPS)

A Business Partner Scan is an overview of possible business partners with their contact information in a target country. These business partners are personally approached by the Embassy's economic team and have indicated they want to come into contact with the Dutch company requesting this service. Dutch companies can profit from the government's extensive network of offices abroad, local market knowledge and know-how to deal with language and cultural barriers. There is also a possibility to opt for a simplified version of the BPS.

14.2 Starters International Business (SIB)

This program aims to support companies likely to be successful with their first steps in a foreign market. Companies can apply for a voucher worth €2.400 that can be used for individual coaching support supplied by various agencies, such as the chamber of commerce, various trade associations and consulting companies.

14.3 Dutch Trade and Investment Fund (DTIF)

This fund is meant for Dutch companies wanting to invest in or export to foreign markets. DTIF offers support through loans, guarantees, and direct or indirect shares with a repayment obligation. Companies can apply for a financial support up to 15 million Euros for each project. This business support instrument is implemented by RVO.

14.4 Business Subsidy scheme for Demonstration, Feasibility and Investment studies/projects (DHI)

The DHI scheme supports Dutch enterprises that want to invest in or execute a project in emerging markets and in developing countries.

14.5 Partners Partners for International Business (PIB)

Create market entrance and long-term positioning of clusters of Dutch SMEs in promising markets with the help of the unique role of the government. Promotional activities include missions, seminars, liaison, Holland branding and promotion materials.

14.6 Relevant links and contacts

- The Embassy of the Kingdom of the Netherlands in Buenos Aires: BUE-EA@minbuza.nl
- Embassy of the Netherlands in Buenos Aires: ww.nederlandwereldwijd.nl/landen/argentinie
- Embassy of Argentina in the Netherlands: www.epbaj.mrecic.gov.ar/
- Dutch Chamber of Commerce in Argentina: www.ccah.org.ar/
- Netherlands Enterprise agency (RVO): www.rvo.nl
- Agrivalu SA: www.agrivalu.biz p.verhey@agrivalu.biz

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