

# Disarray in Agricultural Markets



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## The Issue

In 2018 and 2019, sudden shifts in agri-food trade patterns and trade policy have become the order of the day. The shifts experienced are not *at the margin* (say, in the order of 2-5 percent); they have been in a much greater order of magnitude, and much more difficult to conceptualize and analyze.

To illustrate, Rabobank has recently estimated that the Chinese sow herd could shrink by 20 percent in 2019 due to African Swine Fever (ASF) and measures invoked to control the disease and/or poor profitability conditions. Starting from a base of around 35 million sows, this could be a loss of around 7 million sows. For reference, the US sow inventory has ranged just over 6 million sows.

Similarly, in early March, 2019, it was announced that the Chinese government has revoked permits facilitating Canadian exports of canola to China by James Richardson International (JRI) for unspecified reasons. JRI is among the largest, if not the largest, handler of canola in Canada. According to the Canola Council, Canadian canola production has recently ranged around 18 million tonnes, of which about 10 million tonnes is exported. Approximately 40% of Canadian canola exports are to China, or about 4 million tonnes. As of March 22, 2019 Chinese importers are not importing canola from Canada. Some media outlets are reporting that this could be extended by China to cease importing Canadian wheat, peas, and flax.

These are not isolated examples. China appears poised to draw down its very high rice stocks (last estimated at around 110 million tonnes) for both human and animal feed, lowering demand for imported feed grains, and lowering import requirements of rice. At the same time, in the face of

large US soybean stocks, the 2019 US planting intentions appears set to shift into corn acreage. With corn and rice substitutes in livestock rations, the combination of significant releases from storage in China and increased US corn acreage presents the prospect of declining world feed grain prices.

Moreover, the support authorized at up to \$US 12 billion announced in 2018 could serve to mitigate the shift of US soybean acres to corn. None of the scenarios currently evident are supportive to crop prices in the US, and the likelihood of lower crop prices looms across the board.

The purpose of this policy note is to take stock of the developing situation in agricultural markets as it exists prior to North American planting of the 2019 crop, and to make some sense of the ramifications of large and sudden shifts in agricultural markets, trade policies, animal disease status, and geopolitics.

## Markets, Equilibrium, and Adjustment

Open markets in agriculture continuously adjust to supply and demand based on an expectation that markets will reach an equilibrium, both domestic and international, that can be envisioned by market participants. This expected equilibrium frames production, procurement and marketing arrangements, the capacity of physical infrastructures, and financial requirements, notably cash liquidity.

The time lag for adjustment in field crops, feed grains, oilseeds, pulses, etc., can be six months to a year; for cattle, the time period can be well over three years; for hogs, probably six months to a year. As new supply and demand data become available, the expected equilibrium can change, but the production

systems are already established with planting and breeding decisions made earlier.

Procurement and marketing arrangements are made to provide for and protect margins at various stages of the supply chain; this requires confidence that markets will adjust predictably toward an equilibrium. The best illustration is the use of futures markets in hedging, with the expectation that futures prices move toward equilibrium and will protect the margins of supply chain intermediaries.

Physical capacities assume not only the size of local production to handle products driven by equilibrium expectations, but also timing and the period in which product will be stored. Financial requirements implicitly assume particular levels of price volatility and timing as the market moves toward equilibrium. In turn, both physical infrastructure and financial requirements assume an understanding of trade and market access arrangements, both domestic and international.

The worry as of early spring 2019, described below, is that there is little clarity or stability in envisioning the “expected equilibrium” in the fall for field crops that will be planted in the next two months in Canada, US and other northern hemisphere countries. Nor is there clarity in the livestock markets. And neither is there clarity in the trade arrangements that will exist when crops are harvested this fall or livestock are marketed from breeding decisions made this spring. Futures markets are increasingly volatile reflecting the often changing views of plantings, success or failure in US-China negotiations, resolution to steel and aluminum tariffs, etc.

The assumption of markets moving toward a tangible equilibrium, so central to understanding and facilitating adjustment in normal periods, can actually create something of a myopic view when confronted with dramatic shifts. Initially it seems impossible-how can China simply stop importing US soybeans or Canadian canola when the volume is so massive and the apparent dependency so great? Existing trade

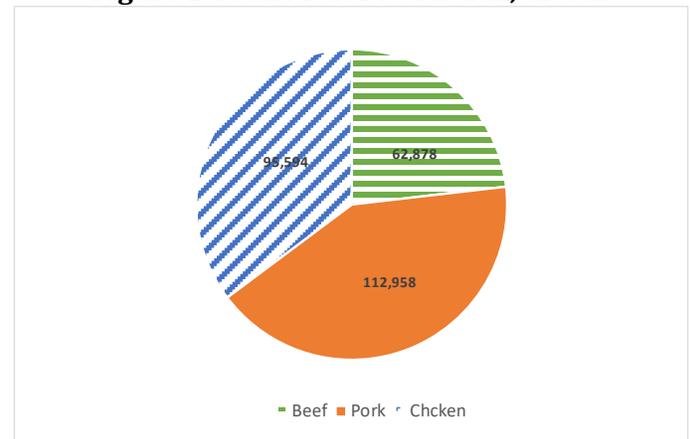
flows and market adjustments to maintain them can minimize or neglect substitution from other products or competitors that have not previously occurred, and the interconnectedness of product markets.

Alternatively, the market equilibrium perspective can contain a type of mean-reversion bias; the sense that when the shock of today eventually blows over and cooler heads prevail, things will basically return to normal and past expectations will once again apply. But another possibility is that the turmoil is sufficiently severe that it causes businesses and countries to move on from the past conditions that characterized the old equilibrium. In this case, there is no reversion back to the old norm and the situation governing the market is forever changed. Markets forge ahead into the unknown.

### Livestock and Meat Situation

The leading sources of meat protein produced in the world, exclusive of fish, are pork, chicken and beef. In 2018, this amounted to about 271 million tonnes. Production of pork is the largest source of meat protein, at about 113 million tonnes, followed by chicken at 96 million tonnes, and beef at 63 million tonnes.

Figure 1 Total Meat Production, Global



Source: USDA-FAS

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Appendix Table 1 provides the detail underlying Figure 1. Production from China is about 48 percent of global pork production, and China is also the largest pork importer. China is also a major producer of chicken and beef; it is a small net exporter of chicken and major net importer of beef.

The appendix table also illustrates that the exporting countries with capacity on a scale to supply China are quite limited. The US, EU, Canada and perhaps Brazil are the countries with export capacity to be significant pork suppliers to China. Brazil, the US, Australia and India operate an export scale comparable to Chinese beef imports. But in any case, no single country has stand-alone capacity to supply China, even if it dropped all of its other export customers.

Information on the ASF situation in hogs continues to emerge from east Asia. As of March 19, 2019, ASF is now present in China, Mongolia, and Vietnam, with 33 outbreaks ongoing in 14 districts in China, 3 outbreaks encompassing 6 regions in Mongolia, and 100 outbreaks in 17 administrative districts in Vietnam, generally in small-holder farm operations<sup>1</sup>.

The ultimate production impact of ASF in China remains a source of some speculation. On March 19<sup>th</sup> 2019, Reuters reported on Chinese government statistics indicating that the Chinese sow herd was down 19 percent in February 2019 compared with a year earlier<sup>2</sup>. Almost any of the ranging estimates dealing with ASF in China suggest a coming collapse in Chinese pork production. There is also evidence of softening demand for pork in China, apparently out of consumer food safety fears related to ASF. However, even with softening demand, meat demand in China is dominated by pork. USDA has estimated that pork

represents about 74 percent of meat protein in the Chinese diet.

Consumer switching away from pork in China is likely to lead to chicken as a substitute meat. The data in Appendix Table 1 tells us that China can pull back some chicken exports to satisfy increased demand, but clearly much is riding on Chinese chicken production, and any setbacks in chicken output would be especially severe in the current environment. In this regard, China has had frequent outbreaks of a number of strains of hi-pathogenic avian influenza (AI). Both China and Vietnam are currently reporting cases of AI; the significance of this in materially influencing meat production is unclear at this time.

Based on the data in Table 1, consumption of meats (excluding fish) in China was about 76 million tonnes in 2018. If pork production losses in 2019/20 were in the order of 15 percent of 2018 production volume (54 million tonnes) this would amount to just over 8.1 million tonnes – or about 11 percent of total 2018 Chinese meat consumption<sup>3</sup>. 8.1 million tonnes – almost equal to total global pork exports in 2018 – is an exceptionally large gap in demand to fill, and the data in the table make it clear that this outstrips the capacity of pork exporters to fill, or to be filled by retention of chicken previously exported by China. The gap in Chinese demand will immediately spill over into a global market broadly lacking the capacity to fill it.

An early omen of the situation occurred in early March 2019. The US reported an export sale of pork to China of 24,000 tonnes, despite Chinese duties on US pork. For reference, annual US pork exports to China have typically ranged between 100,000-200,000 tonnes but were very slow through most of 2018, consistent with the Chinese duties. The market

<sup>1</sup> <http://www.rr-asia.oie.int/news/read/article/situationl-updates-and-information/>

<sup>2</sup> <https://uk.reuters.com/article/us-china-soybeans-braun/column-african-swine-fever-may-shift-chinese-soy-demand-for-years-idUKKCN1R015W>

<sup>3</sup> In its Q1 2019 outlook, Rabobank forecasts a decrease in Chinese pork production of 10-20% for 2019. USDA-FAS has most recently forecast a 5% reduction in Chinese pork production for 2019. So a range of estimates exist.

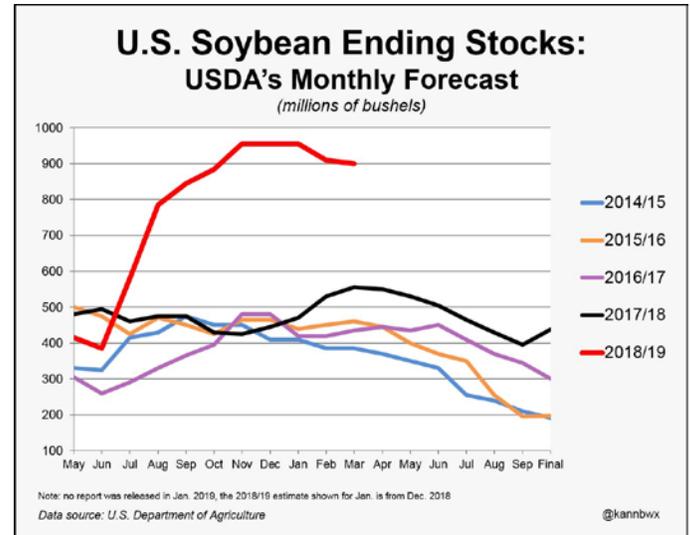
reaction was swift and strong, resulting in a rally in lean hog futures. This is depicted below in Figure 2 for June 2019 lean hog futures, as of trading March 22, 2019. Since the announcement, the June contract price is up about \$US 20/cwt, or over 25 percent.

**Figure 2 CME Lean Hog Futures Prices, June Contract, \$US/cwt**



result has been a burgeoning of US soybean stocks, the result of a large 2018 crop and dramatically decreased export demand from China. This is illustrated in Figure 3, based on USDA data. Early 2019 US stocks of soybeans are forecast around

**Figure 3**



**Oilseed Situation**

The effect of duties enacted by China in retaliation for US steel and aluminum tariffs, as well as Section 301 duties, has been to decrease demand for US soybeans in China. This has been exacerbated by a reduction in pig production and the associated demand for soy meal in feeds; almost all of the soy meal used in hog feeding is derived from imports of soybeans<sup>4</sup>. Finally, the feed industry in China has been directed to reduce inclusion rates of soy meal in hog rations.

The impact has been to supplant US exports of soybeans to China with exports to China from Brazil, Argentina and elsewhere, including Canada. The

double that of recent years. The associated soybean stocks/use ratio forecast by USDA in February for 2018/19 is 22 percent- versus about 10 percent for the same time last year.

The prospect of a resolution to more normal trade relations between the US and China could change the situation, but it is unclear how material this actually would affect things. Some acknowledgement of this is contained in the USDA Long Term Outlook published in March, 2019. "As China looks to Brazil to supply its demand for soybeans, this shift effectively creates two global soybean prices: 1) the China-Brazil (higher) price; and 2) the rest of the world (lower) price. The lower expected return on soybeans for U.S. producers is anticipated to lead to changes in crop plantings – most notably shifting from soybeans into

<sup>4</sup> USDA GAIN Report CH19006 China - Peoples Republic of Livestock and Products Semi-annual

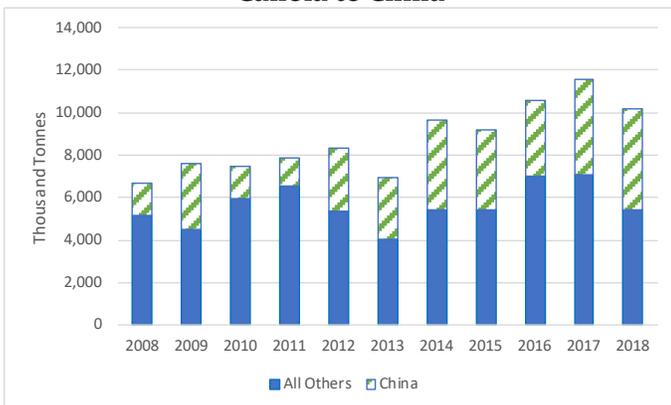
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corn and wheat”<sup>5</sup>. In other words, China has moved on from the US as its primary supplier of imports, and now the US must search for secondary markets, with some expectation of associated price discounts.

The proximate cause of changes in the US soybean market has been political/economic conflict with China. Canada has had its own experience in political/economic conflict with China. While the specifics have not been disclosed, the sanction taken by China against JRI in exporting canola is consistent with it falling victim to this political/economic conflict. Figure 4 below provides some frame of reference for the situation now facing Canadian canola. About 40% of canola exports have been to China, and almost all of the growth in overall export tonnage appears to have come from China.

**Figure 4 Canadian Canola Exports, and Exports of Canola to China**



Source: Canola Council of Canada

This situation now places canola in Canada in a similar position to the US in soybeans- facing protracted uncertainty regarding the demand by a very large customer. In some ways the situation for Canada is worse, as soybeans are the price driver of the oilseed complex- so canola shares the price depression effects of US soybeans, with its own travails in addition. While the Canadian government

is working to resolve the dispute, there is no known timeline for the re-approval of JRI and the resumption of normal trade in Canadian canola. Surely this uncertainty will weigh on producer decision making this spring.

## Feed Grain Situation

In the face of depressed oilseed prices, the natural substitution is for switching to grains; notably toward corn from soybeans in the Midwest US and eastern Canada, and from canola toward wheat in the west. These shifts, in turn, would be expected to support soybean and canola prices, and help to restore some equilibrium between grain and oilseed pricing.

However, while this is rational and plausible, in this environment the economic logic may not bear itself out. The first obstacle is support from government. In 2018, the US government announced emergency funding of up to \$US 12 billion under the Market Facilitation Program to cushion the effects of trade retaliation on agriculture. Based on analysis done at the University of Illinois, it is expected that for Illinois farmers, the program will pay out \$US 58/acre for soybeans, \$US 1/acre for corn, and \$US 5/acre for wheat and that it will significantly increase farm incomes<sup>6</sup>. Surely this will limit adjustment toward grains in response to low soybean prices. Canada has not developed these types of commodity support programs.

Secondly, recent changes in policy impacting field crops in China could play a role. First, in 2019 China changed directives to encourage soybean production in lieu of corn production through a relative increase in grower subsidy payments for soybeans over corn; however, analysis done by the USDA suggests that in many areas the incentive still exists to produce corn

<sup>5</sup> USDA Agricultural Projections to 2028. Office of the Chief Economist, USDA. March, 2019

<sup>6</sup> <https://farmdocdaily.illinois.edu/2018/10/reviewing-prices-and-market-facilitation-payments.html>

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over soybeans<sup>7</sup>. At the same time, China plans to release rice stocks for food and feed use which compete with other cereals.

## Geopolitical Situation

A number of geopolitical factors are in play which stand to impact agricultural markets going forward. Chief among these are the US-China trade negotiations, but also the prospect of US Section 232 duties on automobiles, and the US International Trade Commission study regarding injury associated with steel and aluminum imports.

The outcome of US-China negotiations could generate some manner of managed trade between the two countries. This could include a commitment for minimum trade levels, and/or quotas. The latter arrangement has already been agreed to by some countries with the US on steel and aluminum. The impact of either minimum commitments or quota will be to restrict market access and to magnify the volatility of price and trade adjustments on third countries, including Canada. In all likelihood, other countries will challenge this sort of arrangement.

China may drop or reduce its retaliatory tariffs on US pork in a settlement of trade tensions, or even regardless of a settlement, due to the supply gap and need for pork imports. The same is not true of US soybeans or the measures enacted against Canadian canola. China's oilseed demand will be greatly reduced due to diminished pork production, and it can enact/retain oilseed import barriers at little cost to itself. It may also be less likely to lift these trade measures knowing that it has such sensitivity for the US and Canada, and thus leverage. In any case, Brazil has now supplanted the US as the lead soybean supplier to China.

The imposition of Section 232 tariffs raised by the US on automobiles could result in wide ranging retaliatory measures. The EU has been explicit about this, with speculation that it will focus many of its retaliatory measures on agri-food products. Similar responses from other countries affected can be anticipated.

A finding of injury due to US steel and aluminum imports will make it more difficult for the US to remove the duties on these products raised against the Mexico and Canada. Both Mexico and Canada are unlikely to ratify the CUSMA agreement without the unconditional removal of steel and aluminum tariffs. A finding of injury could be used to strengthen the US resolve to impose managed trade on Canada and Mexico in steel and aluminum, potentially undermining CUSMA. At the same time President Trump presumably wants get CUSMA ratified prior to the 2020 election, buffering the situation.

In short, there appears little short of unilateral capitulation on behalf of both the US and China from their dispute and removal of all tariffs that could restore greater certainty or equilibrium in agricultural markets. This would seem exceptionally unlikely.

## Outlook

Interestingly, the market outlooks published by some leading organizations does not envision major shifts going forward. The USDA Agricultural Projections to 2028 released in March, 2019 do not reference ASF as a disruptive force in protein markets. As identified above, the USDA outlook identifies a structural change in soybean pricing, with Brazil supplanting the US as the primary supplier of soybean imports to China. In its soybean price outlook, USDA implies that the US will be highly effective in finding new markets

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<sup>7</sup>[https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Gain%20and%20Feed%20Update\\_Beijing\\_China%20-%20Peoples%20Republic%20of\\_2-13-2019.pdf](https://gain.fas.usda.gov/Recent%20GAIN%20Publications/Gain%20and%20Feed%20Update_Beijing_China%20-%20Peoples%20Republic%20of_2-13-2019.pdf)

to absorb product formerly exported to China. It is largely a *status quo* outlook.

The most recent OECD agricultural outlook to 2027 dates from 2018. For the most part it envisages international agricultural prices fluctuating at below the rate of general inflation. It also allows for temporary price spikes, within a general downtrend in agricultural prices on an inflation adjusted basis.

Two observations are warranted. First, the situation in each of protein, oilseed, and grain markets is moving rapidly and capturing and analyzing these data on a timely basis in the large economic models underlying the USDA and OECD outlooks will be practically difficult.

Secondly, models with parameters estimated from or calibrated against historical data, such as those underlying the USDA and OECD outlooks, will tend to reflect a bias toward reversion to past experience, and have some built in resistance to generating out of sample results. Extreme or unprecedented situations end up being viewed as outliers. In this case, models cannot draw from experience with broad volatility in farm prices led by the protein complex and the associated secondary realignments, nor multiple significant bilateral actions taken between countries.

## Conclusion

In the spring of 2019, an ominous situation is developing in global agricultural product markets. The prospect exists of, simultaneously, a very strong bull market in meat proteins led by pork production gaps in China, and a bear market with low prices in oilseeds and perhaps grains. However, there is little clarity on the situation, and the bounds or equilibrium that the market is moving toward is unclear. It is uncharted territory.

With the situation currently in place, influenced heavily by geopolitics, it is unclear that immediate changes or agreements on trade and geopolitical negotiations will lend much clarity to the situation.

China may drop its pork tariffs against the US, but the situation in China is sufficiently tight that they are importing US pork over the duties anyway. China does not need US soybeans the way it has in the past due to structurally reduced demand and its expanding trade relations with Brazil on soybeans. China can afford to restrict its canola imports from Canada because, in the current situation, the demand pressure is off and the product is likely not needed- but can cause considerable pain to Canadian canola producers.

The implication is that we should not expect any immediate resolution to the trade issues on soybeans or canola, or if there is a resolution on US soybeans, it may be a managed trade arrangement between the US and China, which is likely to disadvantage other countries.

However, the demand for vegetable oil in China has not been impacted. This could present a workaround in the form of vegetable oil export, with the understanding that China has an infrastructure built on crushing imported oilseeds, and that as such vegetable oil export capacity in North America at a scale for Chinese export would need to be built- at some risk.

ASF in China is the major source of disruption outside of trade policy and geopolitics propelling the current situation. China is attempting to control ASF outbreaks, but it is not going away in China. This creates an increased likelihood of ASF spread to other countries and increased production volatility. Vietnam now has ASF. Other countries, especially Canada must be extremely vigilant regarding biosecurity and prevention to combat ASF. In Canada's case, the risk can hardly be overstated due to its pork export dependency.

The pork market rally in response to ASF seems to have kicked off suddenly, with repeated limit up moves in futures prices. This could be something of a perilous situation. The trigger for the rally seems to have been the March US export sale of pork to China.

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However, the real pork supply gap in China due to ASF is probably still some months away. In the intervening period, flooding in the US Midwest is likely to impact futures markets, such that the real driver of the bull market is difficult to identify. Moreover, with hog prices coming off lows, surely there is significant selling pressure that can bring prices back down. This could occur before the real pork supply crisis in China manifests itself.

This introduces the prospect of much greater financing required to hold hedging positions and ride out volatility. Attempting to time this situation has probably already resulted in casualties- for example, back in January, Barron's promoted the idea of buying live cattle futures as a means of capitalizing on the ASF situation- with the risks of doing so acknowledged<sup>8</sup>.

As it stands, Canadian agriculture looks forward to the beginning of the cropping season and planning for livestock production with exceptional uncertainty. By harvest, the prospect of a managed trade between the US and China in farm products could exist, with Canada on the outside looking in. The restraints on export market access to China for canola could be still in place. The pork market, with beef moving in strong correlation, may have gone through multiple bull market cycles with sudden price drops, with a very different pattern of returns between field crops and livestock. Farmers, handlers, processors, agricultural lenders, and policy makers should prepare themselves for the prospect of a rough ride in 2019-20.

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<sup>8</sup> <https://www.barrons.com/articles/beef-prices-look-ready-to-soar-51546614000>

Appendix

Table 1 Global Meat Production, Consumption, and Trade, Thousand Tonnes, 2018

Production	Pork		Chicken		Beef		Exports	Pork		Chicken		Beef	
	China	54,150	Brazil	13,550	Brazil	9,900		EU	3,050	Brazil	3,685	Brazil	2,100
	EU	24,100	EU	12,315	EU	7,915		Canada	1,350	EU	1,425	India	1,665
	Brazil	3,675	China	11,700	China	7,325		Brazil	685	Thailand	850	Australia	1,630
	Russia	3,235	India	4,855	India	4,300		Chile	185	China	460	New Zealand	603
	Vietnam	2,675	Russia	4,725	Argentina	2,950		Mexico	180	Turkey	380	Argentina	500
	Canada	1,960	Mexico	3,500	Australia	2,300		China	175	Ukraine	300	Canada	500
	Philippines	1,600	Thailand	3,120	Mexico	1,960		Russia	45	Belarus	175	Uruguay	440
	South Korea	1,375	Turkey	2,250	Pakistan	1,800		Australia	49	Russia	150	Paraguay	380
	Mexico	1,310	Argentina	2,175	Turkey	1,400		Vietnam	35	Argentina	125	EU	350
	Japan	1,285	Colombia	1,685	Russia	1,340		South Africa	18	Canada	125	Mexico	305
	US	11,992	US	19,350	US	12,286		US	2,717	US	3,158	US	1,435
	Others	5,601	Others	16,369	Others	9,402		Others	48	Others	320	Others	650
	Total	112,958	Total	95,594	Total	62,878		Total	8,537	Total	11,153	Total	10,558
Consumption							Imports						
	China	55,725	China	11,590	China	8,530		China	1,750	Japan	1,140	China	1,200
	EU	21,065	EU	11,540	Brazil	7,850		Japan	1,510	Mexico	845	Japan	835
	Russia	3,250	Brazil	9,866	EU	7,935		Mexico	1,175	EU	650	Hong Kong	560
	Brazil	2,992	India	4,850	India	2,635		South Korea	735	Saudi Arabia	575	South Korea	560
	Japan	2,785	Russia	4,800	Argentina	2,450		Hong Kong	475	Iraq	620	Russia	495
	Vietnam	2,660	Mexico	4,339	Mexico	1,865		Philippines	270	South Africa	535	EU	370
	Mexico	2,305	Japan	2,826	Russia	1,823		Canada	230	UAE	408	Egypt	300
	South Korea	2,010	Thailand	2,279	Pakistan	1,741		Australia	225	China	350	Chile	310
	Philippines	1,869	Argentina	2,060	Turkey	1,489		Colombia	140	Angola	310	Canada	240
	Taiwan	933	South Africa	1,845	Japan	1,316		Taiwan	120	Philippines	310	Mexico	210
	US	9,760	US	16,241	US	12,206		US	483	US	63	US	1,373
	Others	7,079	Others	21,551	Others	10,884		Others	991	Others	3,557	Others	1,927
	Total	112,433	Total	93,787	Total	60,724		Total	8,104	Total	9,363	Total	8,380

Source: USDA FAS [https://apps.fas.usda.gov/psdonline/circulars/livestock\\_poultry.pdf](https://apps.fas.usda.gov/psdonline/circulars/livestock_poultry.pdf)

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