Asian-Aust. J. Anim. Sci.
Vol. 24, No. 11 : 1629 - 1636
November 2011

www.ajas.info
http://dx.doi.org/10.5713/ajas.2011.11155

Pork Production in China, Japan and South Korea

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ABSTRACT : Global pork markets are becoming more competitive, riding the wind of the bilateral free trade agreement. China is the world's largest pork producer with nearly 50% of the world's total production. China's fast growing economy has provided its people with higher purchasing power, resulting in a rapid expansion of the Chinese swine industry over the past decades. Worldwide, China consumes the greatest amount of pork and it is believed that this trend will continue. Japan is the world's largest pork importing country, even though it also produces a lot of pork. The Japanese swine industry encounters weighty obstacles in production costs and environmental limitations which result in reduced domestic supply and creates the situation in which Japan has to import a significant amount of pork for their consumption. South Korea is also a large buyer of pork, with a status greatly influenced by the struggle that the country has faced with Foot and Mouth Disease (FMD) which occurred in 2000, 2002 and 2010. High production costs, low production efficiency, and forced culling following the FMD outbreak resulted in the loss of many hog farming households in the country, reducing supply of domestic pork in the face of continued demand. Overall, pork production in these economically important countries can greatly impact the industry globally. The goal of this review paper is to describe pork production in China, Japan, and South Korea and discuss these countries' role in global pork export markets. (**Key Words :** Pork, Production, China, Japan, South Korea)

INTRODUCTION

Global pork markets are becoming more competitive on the wings of the wind of the bilateral free trade agreement. Table 1 shows world per capita pork consumption from year 2005 to 2008. According to this table, Hong Kong is the first ranked region with around 65 kg per year followed by the European Union and Taiwan. The pork consumption in South Korea was seventh in 2005 and jumped up to fifth in 2008, which is partly due to the preparation process for the Free Trade Agreement between Korea and the United States. China is the world's largest pork producer, with nearly 50% of the world's total production (Table 2). Japan is the largest consumer of U.S. pork, purchasing 576,062 metric tons of U.S. pork in 2009 (Pork Checkoff, 2009). Frozen pork exports from the U.S. have maintained growth in the Japanese market. Pork consumption of these countries in Asia has increased over time and these markets are expected to keep growing in the future. Pork production in China, Japan and South Korea has greatly affected global pork export markets and this review paper will focus on those influences.

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Received May 26, 2011; Accepted August 16, 2011

China

China covers almost half of the world's pork production, and is the largest pork and hog producer and one of the top pork consuming countries in the world (Tables 1 and 2). The total Chinese pork production in 2010 was about 50 million metric tons, which is close to 50% of total world pork production. A fast growing economy in China has provided the country with higher purchasing power, which allowed the Chinese swine industry to expand very quickly over the past decades.

Commercial hog farms in China were not very strong before 1985. Pork production was 10 million tons in 1979, growing to 43 million tons in 2007 (China's Pork Industry, 2008). Most of Chinese hog production was backyard production with pigs raised for family consumption, and the price set by the government. In 1985, the government introduced a policy to make the rural markets free, allowing free trade to the rural area. The free market system made hog production very active in the 1990s, which resulted in the balance of pork production and domestic consumption (35.9 vs. 35.8 million tons; China's Pork Industry, 2008). The Chinese government started to focus on improvement in productivity in the late 1990s and early 2000, about the

Table 1. World per capita pork consumption

2008 Rank	Country	kg			
		2005	2006	2007	2008
1	Hong Kong	65.8	65.8	65.1	65.2
2	EU-27	43.4	43.8	42.9	42.4
3	Taiwan	41.6	41.9	41.3	41.8
4	China	38.1	39.5	35.0	36.1
5	South Korea	26.9	28.8	31.5	29.3
6	United States	29.4	29.0	29.0	29.1
7	Canada	29.5	28.5	25.5	25.0
8	Australia	21.5	21.0	21.7	22.0
9	Vietnam	19.2	20.3	21.9	21.8
10	Chile	17.7	19.0	20.8	21.1
11	Russia	17.3	18.5	21.8	20.7
12	Japan	19.7	19.2	19.5	19.7
13	Ukraine	11.6	11.3	18.0	16.0
14	Mexico	14.7	14.7	14.6	15.0
15	Philippines	13.6	13.9	13.2	12.9
16	Brazil	10.5	11.6	12.2	12.5

Quick Facts: The Pork Industry at a Glance, Pork Checkoff, 2009.

same time that pig breeders began to introduce foreign breeds to develop hybrids with the domestic breeds to increase meat quality and productivity. These changes likely played a part in the dramatic increase in specialized household operations from only 3% in 1985 to 51% in 2007, with this operation type becoming the most popular of the non-commercial pig operations in China.

Specialized household hog operations are those that obtain the majority of their income from pork production. These producers are usually defined by how many hogs they produce per year, often 10 to 500 head (China's Pork Industry, 2008), usually purchased as feeder pigs from a commercial breeding farm. Unlike traditional backyard producers, specialized household operations depend on feed grain produced on their own land and purchased from the market. It is predicted that traditional backyard production will decrease over the next 5 years, with the more specialized household operations replacing them.

China can be divided into the Northwest, Southwest, Southern, Central, Eastern, Northern Plain, and Northeast regions (China's Pork Industry, 2008). Traditionally, the Northern Plain, Southwestern, Central, and Eastern parts of China are high grain production areas and are highly populated. As a result, those areas have produced about 70% of the total pork production in China since 1980 (Table 4). The Northern Plain region is the number one pork producing region at 21.2%, followed by the Southwest at 20.3%, and the Central region at 18%.

In pork production, when regional feed corn production increases, hog production does as well and vice versa. This is reflected in a reduction of hogs in the Eastern region with low corn production and a concomitant increase in the Northern Plains region of China which has a high level of corn production (Tables 4 and 5). The Northeast has less hogs although it produces more corn because the cold weather does not allow for efficient livestock production.

Until the mid 1990s, the Southwest region was the most important pork producing region, generating about 23.5% of total hog production, which decreased slightly in 2007 to 20%. Regardless of the decrease, the Southwest area is still an important pork producing region of China. The type of production in this area is primarily backyard production; it consists of about 90% of the total production. The third

Table 2. Change in world pork production from 2005-2007 (1000 metric tons)

Country	2005	2006	2007	Share (%)
China	45,553	46,505	42,878	47
EU-27	21,676	21,791	22,858	23
United States	9,392	9,559	9,962	10
Brazil	2,710	2,830	2,990	3
Russian Federation	1,735	1,805	1,910	2
Canada	1,920	1,898	1,894	2
Vietnam	1,602	1,713	1,832	2
Japan	1,245	1,247	1,250	1
Philippines	1,175	1,215	1,245	1
Mexico	1,195	1,108	1,150	1
South Korea	1,036	1,000	1,040	1
Others	5,312	5,485	5,721	6
World Total	94,551	96,156	94,730	100

China's Pork Industry: Recent Trends and Implications for World Meat Trade and Grains Trade. Informa Economics.

Table 3. Top ten pork producing countries in 2009

Rank	Country	1,000 metric tons
1	China	46,205
2	EU-27	22,596
3	United States	10,599
4	Brazil	3,015
5	Russia	2,060
6	Vietnam	1,850
7	Canada	1,786
8	Japan	1,246
9	Philippines	1,225
10	Mexico	1,161

Quick Facts: The Pork Industry at a Glance, Pork Checkoff, 2009.

largest pork producing region in China is the Central region, accounting for 18% of the total population. Like the Southwest region, Central region pork production has been slightly declining from 20% in 1985 to 18% in 2007, likely because the region has to import feed grains from other regions to meet its demand (Tables 4 and 5).

From 1997 to 2008, the vastly preferred meat in China was pork. In Figure 1, the share changes of pork declined slightly little from over 68% in 1997 to about 63% in 2007, but pork remains dramatically dominant in total meat shares. While pork consumption as a percentage of total meat consumed has been declining over the past 10 years, the consumption of pork per person has been generally increasing over the years (Figure 2).

The consumption of pork per person has been increasing because of the growth of income and the pork production stimulus policy in China; it is predicted to continue to grow in the future. Per capita pork consumption in China has increased from 29 kg in 1997 to 35 kg in 2006, up 22% in 10 years. A dramatic decline in 2007 to 32 kg per person was due to reduced supply and resulting higher pork prices caused by pig diseases and rising feed costs. Per capita pork consumption in China is estimated to grow to 11% over the next 10 years to 38 kg per person in 2017 (Figure 2). Unless supply can continue to match the estimated demand, China will impact global production as an importer of pork.

As a country, China consumes approximately 32 kg annually which is about 5 kg more than the world average of about 27 kg. The Chinese per capita pork consumption is slightly higher than the United States, Canada, South Korea, Australia, Japan, and Brazil, but is lower than Hong Kong and Taiwan (Figure 3). In 2007, Hong Kong's per capita pork consumption was about double that of mainland China, with Taiwan at approximately 8 kg more than mainland China (Figure 3).

Japan

Japan produces and consumes a lot of pork since this meat is the foundation of their food industry along with rice and vegetables. Figure 4 represents the share of agricultural products in Japan. Livestock production comprises about 30% of all agricultural products, which is about 28 billion dollars. In Japanese livestock production, dairy production is the highest at about 25.6% and swine production is second at about 21%, or approximately 6 billion dollars (Table 6).

Table 4. Regional distribution of pork production in China (%)

	1980	1985	1990	1995	2000	2005	2007
Northeast	9.9	8.2	7.9	9.5	9.3	9.6	10.3
Northern Plain	17.2	16.1	16.9	19.2	22.0	22.6	21.2
Northwest	5.1	4.5	4.6	4.6	4.2	4.3	4.4
Southwest	19.3	22.9	23.5	20.1	20.5	20.3	20.3
Central	16.0	17.8	18.6	20.2	17.6	17.7	18.0
East	23.1	20.5	17.7	15.3	15.3	15.0	14.8
South	9.4	10.1	10.7	11.0	11.0	10.4	11.1

* China's Pork Industry: Recent Trends and Implications for World Meat Trade and Grains Trade. Informa Economics.

Table 5. Regional distribution of corn production in China (%)

	1980	1985	1990	1995	2000	2005	2007
Northeast	29.1	28.4	38.5	36.0	28.0	36.2	36.5
Northern Plain	34.6	36.3	32.1	34.8	34.3	31.3	32.7
Northwest	12.2	11.4	10.3	9.9	12.6	13.1	12.6
Southwest	17.4	15.4	12.1	10.8	14.7	11.5	11.1
Central	1.7	2.1	1.5	1.8	3.3	2.4	2.2
East	3.1	4.8	4.1	5.1	4.6	3.5	3.1
South	1.9	1.5	1.4	1.6	2.5	2.0	1.8

* China's Pork Industry: Recent Trends and Implications for World Meat Trade and Grains Trade. Informa Economics.

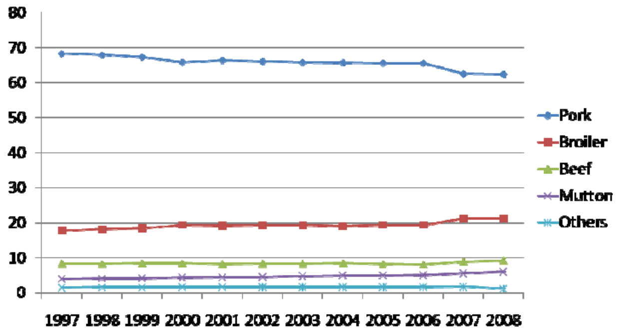

Figure 1. Share changes of pork production in China (%). China's Pork Industry: Recent Trends and Implications for World Meat Trade and Grains Trade. Informa Economics.

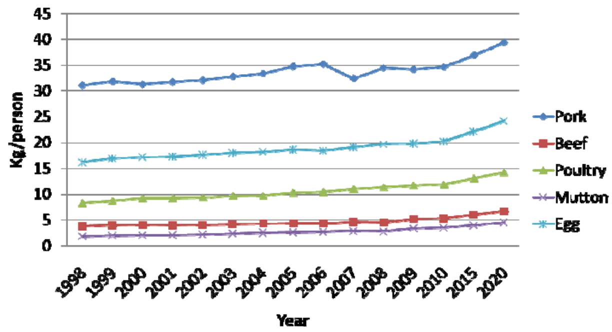

Figure 2. Per capita meat and egg consumption in China. China's Pork Industry: Recent Trends and Implications for World Meat Trade and Grains Trade. Informa Economics.

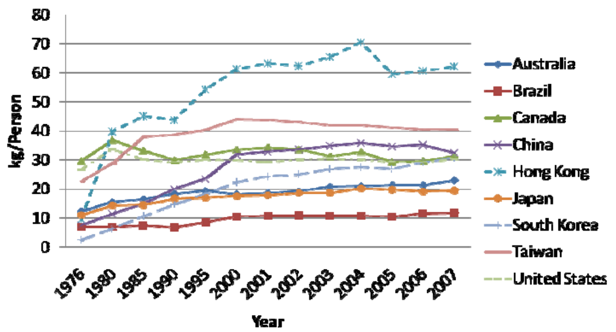

Figure 3. Per capita pork consumption over years. China's Pork Industry: Recent Trends and Implications for World Meat Trade and Grains Trade. Informa Economics.

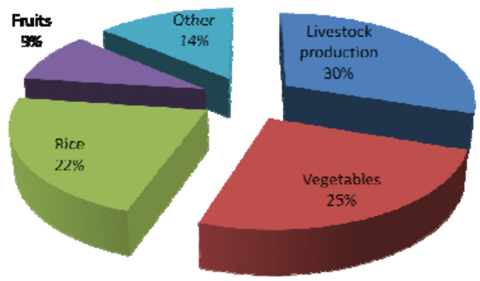

Figure 4. Share of Japanese agricultural products. Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries.

Japan is ranked 8th in pork production in the world, and produces 1.3 million metric tons of pork per year (Table 3). However, the number of farming households in Japan has declined steadily since 1999 (Japanese Ministry of Agriculture, Forestry and Fisheries, 2009). From 2006 to 2007, there was a decrease of 4.2%, which is equivalent to 7,230 households. There has been a steady decline in total number of pigs over the years in Japan. However, there was some stability over the years. The decrease from 2006 to 2007 was approximately 0.1%, which was about the same from the previous year (Figure 6). Also, the number of sows in 2007 decreased 0.5% compared to 2006. In the mean time, there was an increase in total number of pigs after 2008, but it decreased again and showed about the same number as previous years because of FMD and hot weather (Livestock statistics, 2011). Interestingly, the number of head per farm household steadily increased from 1999-2011, as noted within Figure 7.

Table 6. Livestock production in Japan

Products	Percent (%)
Beef	19.4
Dairy	25.6
Swine	21.1
Egg	16.4
Broiler	10.9
Other	6.5

Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries.

The pork industry in Japan was almost destroyed after the Second World War. However, as the Japanese regained economic power, meat consumption increased dramatically. Free trade in Japan started in 1971 (Hoshino, 2006), which greatly affected pork imports. Earlier on in Japan's importing history, they imported frozen pork products. In 1993, Japan imported fresh meat from Taiwan. However, in 1997 there was foot and mouth disease in Taiwan and Japan stopped importing pork from Taiwan for that year. This ban resulted in a prime opportunity for the U.S. and Canadian pork industries, resulting in an observed increase in pork exports to Japan at the time. Fresh pork imports have increased over the years, and the U.S. exported almost 1.1 billion dollars worth of pork to Japan in 2005. This trend continued and, in 2008, U.S. pork exports were worth 1.5 billion dollars (Pork Checkoff, 2009).

The total world pork production is about 95 million metric tons (Table 2). Out of the world total production, the portion available for export is about 5%, which would be 5 million metric tons, with the portion of Japanese

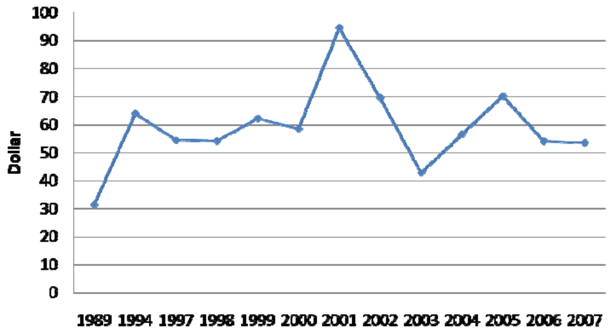

Figure 5. Profit per market hog in Japan. Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries.

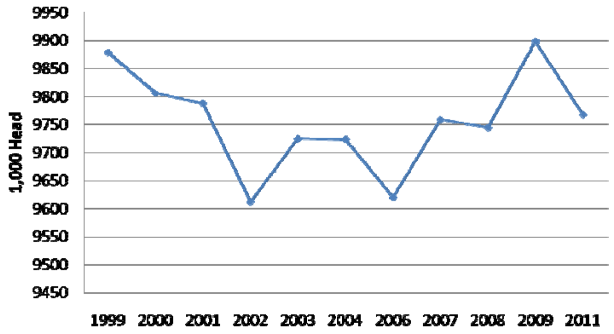

Figure 6. Total number of pigs in Japan. Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries; Livestock statistics. 2011. Japanese Ministry of Agriculture, Forestry and Fisheries.

imports being about 1.2 million metric tons, representing approximately 25% of total world pork imports per year.

Japan is the world's greatest pork importing country (Table 7), greatly impact the world industry. However, the consumption per person ranks only 12th in the world (Table 1). Based on this observation, the Japanese import more pork as a result of economic efficiency. Because pork production costs are very high in Japan compared to other countries, it is more effective from an economical standpoint to import pork (PIC, 2006).

Table 8 shows the number of farm households (producing pork) by region, clearly showing that the numbers decreased over the 5 year span from 2003-2008. The area with the most farm households and animal numbers is in the Kyushu region and the Kanto region, in which the Kanto plain is located. Although the number of farms has decreased over time, the total number of animals has not changed that much from 2003-2008, resulting from and apparent increase in number of animals per farm. Though the Kyushu and Kanto regions have the most farms and total animals, the area of the country with the most animals per farm is the Hokkaido region followed by the Tohoku region.

Represented in Table 9 are the top five pig production prefectures (large-area regions) in Japan which comprise nearly 40% of the country's national production. The Kyushu region produces the most pork since the top two prefectures, Kagoshima (at 793 million) and Miyazaki (at 531 million) are both in that region, located at the southwestern tip of the Kyushu Island. Ibaraki and Chiba are both part of the Kanto region (on the Honshu Island) and represent the third and fourth highest financial production of pork.

The profit per market hog dropped dramatically in 2001, likely due to higher costs of corn oil and the resulting increase in feed prices as corn costs rose (Figure 5). Profits increased in 2004 and 2005 as a result of reduced consumption in beef and chicken due to BSE (Bovine Spongiform Encephalopathy) in the United States and also a result of AI (Avian Influenza) in many places. In 2006 and

Table 7. Total pork imports in each country (1,000 metric tons)

	2005	2006	2007	2008	2009
Japan	1,314	1,154	1,210	1,267	1,210
Russia	752	835	894	1,053	750
Mexico	420	446	451	535	600
South Korea	345	410	447	430	375
Hong Kong	263	277	302	346	345
Canada	139	145	171	194	170
Ukraine	62	62	82	238	240
Australia	105	109	141	152	170
China	88	90	198	430	150
Singapore	85	98	97	91	99
Others	703	846	655	802	841
Total foreign	4,276	4,472	4,648	5,538	4,950
US	464	449	439	377	373
Total	4,740	4,921	5,087	5,915	5,323

Livestock and Poultry: World Markets and Trade. 2009. USDA.

Table 8. Number of pork producing farm houses, head, and head per house by region in Japan

Region	Number of farm houses		Number of head (1,000 head)		Number of head per house	
	2003	2008	2003	2008	2003	2008
Hokkaido	400	300	549	551	1,308	1,854
Tohoku	1,600	1,100	1,641	1,653	1,045	1,559
Hokuriku	300	300	291	295	940	1,166
Kanto	2,600	2,000	2,577	2,577	991	1,308
Tokai	800	600	774	746	1,032	1,236
Kinki	200	100	86	70	539	633
Chugoku, Shikoku	600	400	586	573	994	1,324
Kyushu	2,600	2,200	2,931	3,043	1,114	1,396
Okinawa	400	300	290	237	707	718

Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries.

2007, carcass prices remained relatively the same but feedstuff costs increased, resulting in a small drop in profit per market hog in those years (Swine production report, Japanese Ministry of Agriculture, Forestry and Fisheries, 2009).

South Korea

South Korea produces about one million metric tons of pork every year, which positions it at 11th in the world (Table 2). In 2006, South Korean pork consumption was ranked 5th in the world (Table 1). In the country, pork is the second largest farming sector of agriculture after rice and is followed by beef, milk and eggs (Table 10). In 2003, pork production was 8.3% of the total agricultural receipts, which increased to 10.6% in 2008. Livestock in general represented 7.4 billion dollars (28%) of the total receipts in 2003 and increased to 11.3 billion dollars (35.5%) in 2008. The swine industry represented approximately 2.2 billion dollars (or 30%) of the livestock sector in 2003. Although total sales increased to 3.4 billion for swine for 2008, livestock sales also increased, resulting in swine still representing approximately 30% of the livestock sector (Table 11).

For meat consumption in South Korea from 1995-2008, pork was the preferred meat, with beef and chicken ranking nearly equally far below pork (Figure 9). Although pork consumption increased over the time period reported, chicken and beef did not increase, likely in part due to the global avian influenza pandemic and the finding of mad cow disease in the U.S. Figure 9 shows a similar trend with much more consumption of pork (approximately 20 kg/person consumed annually) than that of chicken.

The number of pork operations in South Korea has decreased dramatically since 2000 (Figure 10). Pork operation numbers peaked in 1996, with 33,000 household pork operations and decreased in 2000 to 23,800 households. By 2009, total swine farm operations in Korea had decreased to just over 7,900 (Figure 10), or 33% of the number reported in 2000. A small farm household is defined

Table 10. Farm receipt of top 5 agriculture products in South Korea

	2007 farm receipt	2008 farm receipt
Rice	655	781*
Pork	277	340
Beef	290	296
Milk	129	134
Egg	71	97

* Korea Swine Association. 2010; Million dollars, Converted 1,200 Korean Won as $1.

Table 9. Top five pig production prefectures (large-area regions) in Japan

Region	$ (million)	Share (%)
Kagoshima	793	13.0
Miyazaki	531	8.7
Ibaraki	461	7.5
Chiba	387	6.3
Hokkaido	363	5.9
Total	2,535	41.5

Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries.

Table 11. Farm receipts in the agricultural sector for South Korea

	Agriculture (A)	Livestock (B; B/A, %)	Swine (C; C/B, %)
2003	26.5	7.4 (27.9)	2.2 (30.2)
2004	30.1	9.0 (30.0)	3.1 (33.8)
2005	29.2	9.8 (33.6)	3.1 (31.9)
2006	29.4	9.7 (33.1)	3.0 (30.9)
2007	28.9	9.4 (32.5)	2.8 (29.4)
2008	32.1	11.3 (35.3)	3.4 (30.0)

Korea Swine Association. 2010; Billion dollars, Converted 1,200 Korean Won as $1.

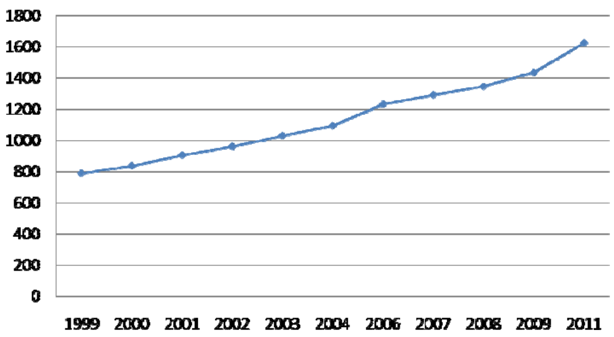

Figure 7. Number of head per farm house in Japan. Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries; Livestock statistics. 2011. Japanese Ministry of Agriculture, Forestry and Fisheries.

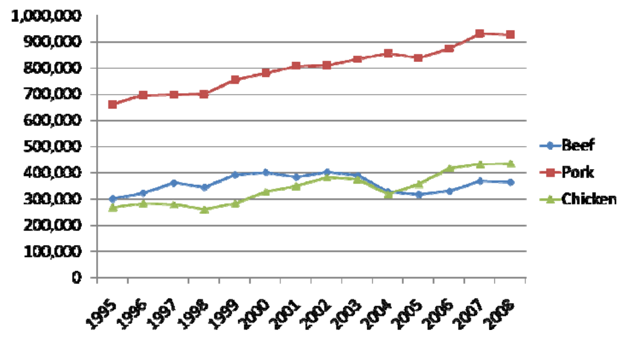

Figure 8. Meat consumption in South Korea. Korea Swine Association. 2010.

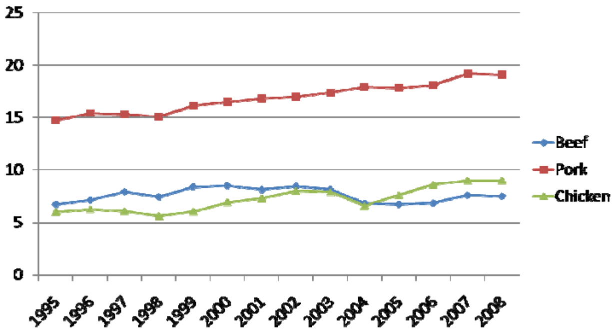

Figure 9. Per capita meat consumption in South Korea (kg/person). Korea Swine Association. 2010.

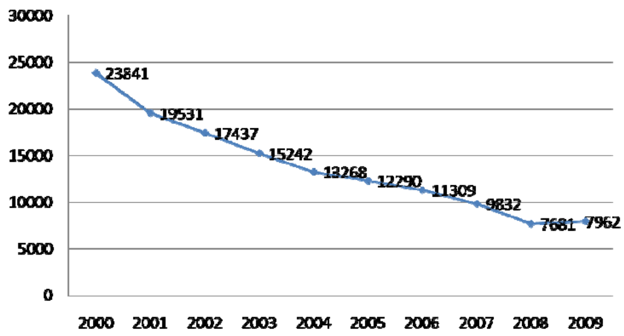

Figure 10. Number of South Korean hog operations. Korea Swine Association. 2010.

in South Korea as having less than 1,000 hogs. In 2000, the number of small farm operations raising less than 10,000 head was 21,500, dropping drastically to 4,800 in 2009, which means that most of small producers gave up their business, likely due to the impact of integration in swine industry during the period (Korea Swine Association, 2010).

While small farm operations decreased, the general trend of the total hog inventory in South Korea was an upward one, basically increasing from 8.2 million in 2000 to approximately 9.6 million in 2009 (Figure 11). From 2006 to 2009, there was a 43% increase in hog numbers. Notable drops in inventory were observed from 2003 to 2004 and again from 2004 to 2008, in part due to the global rise in feed costs; this rise in the cost of feed also contributed to the reduction in small farm household operations.

The number of animals per operation in South Korea increased about 4 times the recorded average of 342 head per operation in 2000 to 1,203 head per operation in 2009. Overall, in the past 10 years, there has been a huge increase in the number of animals per operation (Figure 12). This would be expected as the total number of animals has generally increased, but the number of small farm operations decreased over that time, indicating an expansion

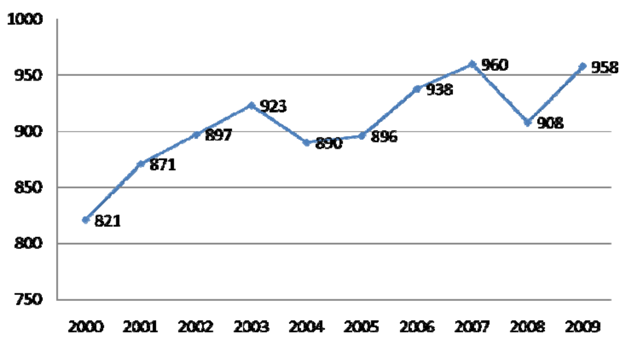

Figure 11. Hog inventory by year in South Korea (10,000 Head). Korea Swine Association. 2010.

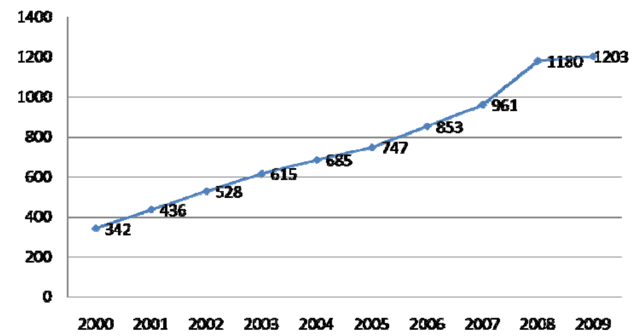

Figure 12. Head per operation by year in South Korea. Korea Swine Association. 2010.

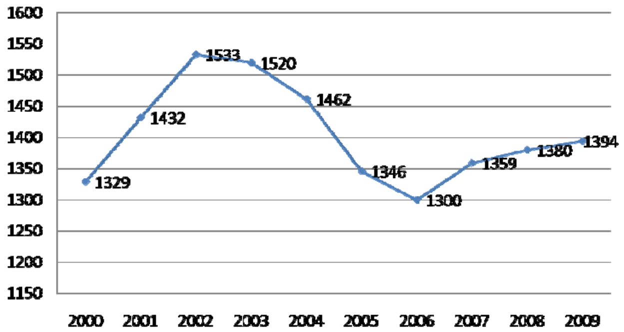

Figure 13. Number of slaughter by year (1,000 Head) in South Korea. Korea Swine Association. 2010.

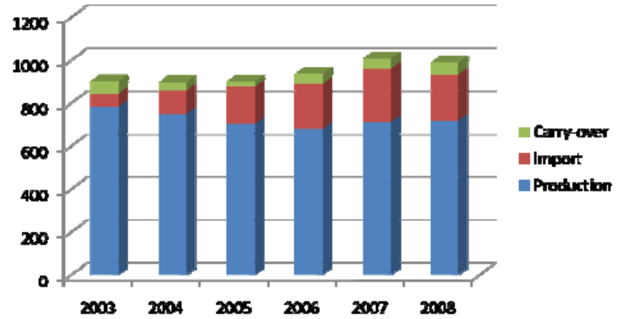

Figure 14. Pork supply in South Korea (1000 MT). Korea Swine Association. 2010.

of larger operations. For example, though operations with 5,000 hogs or more were only 3.33% of all hog operations, they comprise 26.5% of total animal inventory (Korea Swine Association, 2010). The expansion of operations demonstrates that the South Korean swine industry is becoming more effective through structure, modernization, and dramatic improvement of production practices.

In 2000, there were just over 13 million hogs slaughtered annually in South Korea, with the number increasing to 15.3 million in 2002 and then decreasing to 13 million in 2006. After 2006, the number of hogs slaughtered per year slightly increased to 13.9 million in 2009.

The pork supply in South Korea decreased from 2003 to 2006, but slightly increased over the 2006 level in 2007 and 2008 (Figure 14). In 2008, approximately 700,000 tons of pork was produced in South Korea, and about 200,000 tons were imported. Pork imports in 2006-2008 were higher than previous years, which may be explained somewhat by the finding of BSE in cattle and Avian Influenza in poultry, resulting in pork consumption replacing that of beef and poultry. In addition, high costs of production (including feed costs), low production efficiency, and forced culling due to a FMD outbreak starting in 2000 resulted in the loss of many hog farming households in the country, reducing supply in the face of continued demand.

CONCLUSION

China produces almost half of the world pork production, and is the largest pork and hog producer and consumer in the world. China's fast growing economy has provided the Chinese with greater purchasing power, which allowed the Chinese swine industry to expand very quickly over the past decades. It is expected that the high level of pork consumption in China will continue to increase in the coming years.

Japan is the world's largest pork importing country, even though they produce a lot of pork themselves, ranking 8th in the world in terms of pork production. The Japanese swine industry encounters obstacles such as high production costs and environmental limitations, which creates a situation in which Japan continues to import pork for their country. To overcome these obstacles, Japanese pork production has been developing branded pork products and value added pork.

South Korea is ranked as 11th in world pork production but 5th in the world for consumption. The livestock industry makes up 35.5% of total agriculture, and the swine industry represents 30% of livestock industry. However, the high costs of production (including feed costs), low production efficiency, and forced culling due to a FMD outbreak starting in 2000 resulted in the loss of many hog farming households in the country, reducing supply in the face of continued demand, positioning South Korea as a net importer in the global pork industry.

REFERENCES

China's Pork Industry: Recent Trends and Implications for World Meat Trade and Grains Trade. 2008. Informa Economics.

Hoshino, T. 2006. Research report of commodity export industries in Latin America. Aisa Economy Institute.

http://www.kmta.or.kr. Korea Meat Trade Association . 2010

http://www.koreapork.or.kr. Korea Swine Association. 2010

International food supply and demand report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries.

Livestock and Poultry: World Markets and Trade. 2009. USDA

Livestock statistics. 2011. Japanese Ministry of Agriculture, Forestry and Fisheries

PIC. 2006. PIC worldwide survey. PIC company.

Quick Facts: The Pork Industry at a Glance. 2009. Pork Checkoff.

Swine production report. 2009. Japanese Ministry of Agriculture, Forestry and Fisheries.