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Globalization and perspectives of swine production in South America

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Introduction

The ongoing growth of the world population has made researchers ask where food will be produced in the future. What areas will have land and water availability for food production? Which foods can be produced on a large scale in order to satisfy the needs of the world population and, particularly, the current 800 million destitute people? This article aims at analyzing the present situation of pork production in the world, its growth perspectives, its capacity to contribute to the production of animal protein of a high biological value, and the role of South America in the face of this challenge of increasing world hunger.

The current world swine industry

In 2001 pig producers around the world produced 91.18 million tons of pork, with a herd of approximately one billion animals. Asia was the largest producer, turning out 54.76% of the world production (or 49.9 million tons), followed by the European continent, the Americas, Africa, and Oceania (Table 1).

Main world producers

China is, by far, the largest producer of pork. Its 42.786 million ton production accounts for 46.9% of total production in the world. China is also the largest individual consumer in terms of quantity, as most of its production is consumed by its population of more than 1.3 billion inhabitants. As can be seen in Table 2, the ten largest producers in 2001 account for 76.2 % of the world production. Together, they produced 69.5 million tons of pork.

Brazil is the only South American country among the ten largest producers of pork. Its position is progressing, winning positions year after year, and, by the end of this decade, it should be a member of the select group of the five largest producers of pork.

World consumption of pork

If we divide the world production of pork (91.188 million tons) by the human population on the planet, estimated as 6.25 billion people in the beginning of this year, we can conclude that consumption was around 14.59 kg per capita. This number is very expressive, putting pork in first place in the preference of people—earning the title

of “the most consumed meat in the world.” In fact, pork has occupied this position since 1976, when it surpassed beef. In 2001, as can be seen in Table 3, chicken consumption was in second place, with 11.25 kg/person, and beef was third, with 9.57 kg/person. Is the consumption of pork stable or has it grown lately? In the last 32 years, pork consumption by the world population has grown at a rate of 1.83% a year. As can be seen in Table 4, in 1970,

Table 1: World pork production by continent, 2001 (adapted from FAOstat, 2002).

Continent	Production (million tons)	%
Asia	49.94	54.77
Europe	25.05	27.47
America	15.09	16.56
Africa	0.60	0.66
Oceania	0.50	0.54
World	91.18	100

Table 2: Main world producers of pork (million tons, 2001) (adapted from FAOstat, 2002).

Country	Production (million tons)
China	42.78
USA	8.69
Germany	3.90
Spain	2.92
France	2.25
Brazil	2.16
Canada	1.80
Denmark	1.70
Poland	1.67
Russia	1.62

Table 3: World production and consumption of meat, 2001 (adapted from FAOstat, 2002).

Meat	Production (million tons)	Consumption (kg/person)
Pork	91.188	14.59
Chicken	70.358	11.25
Beef	59.819	9.57
Others	15.626	2.50
TOTAL	236.991	37.91

Table 4: Evolution of the world consumption of pork, 1970-2001 (adapted from Pig International e FAOstat).

Year	Consumption (kg/person)
1970	9.20
1980	11.70
1990	12.80
2001	14.59

pork consumption was 9.2 kg per capita, and today is 14.59 kg.

Chicken reached the second place, exceeding beef, only in 1996. Its consumption has grown at a higher rate than pork consumption, but it is not expected that chicken will surpass pork at least in this decade due to the growth of the economy in China, a country which traditionally prefers foods based on pork.

The future of pork production

What will be the world production of pork in 2010?

According to FAO, the world population will be 7.28 billion in 2010. There are two procedures to estimate the production of pork in 2010. The first considers that the consumption per capita will remain the same (14.59 kg). The second procedure assumes that consumption will keep on growing at 1.8% a year. In the second case, pork consumption per capita will be 16.9 kg in 2010.

We may consider that the first possibility is pessimistic and the second optimistic. If we multiply both perspectives by the projected population in 2010 (7.28 billion people), the conclusion is that the world production of pork will be between 106 million tons (pessimistic) and 123 million tons (optimistic).

Where will swine production grow in the world?

If we need to increase world production by 20% in the next ten years in order to provide for the population growth and to reduce hunger, where are the most appropriate places with conditions to receive this increase in production?

A FAO document called "Agriculture Towards 2010" tries to answer this disquieting question through well grounded statistics which evaluate the current trend based on the history of the last few years. This study shows that, in 1978, 60% of pork was produced by developed countries, and that only 40% was produced by the developing countries. However, this percentage has changed dramatically in the last few years, as there has been a higher rate of increase of pork production in the developing countries. The conclusions of this FAO report is that, in 2010, the situation will be the opposite from what it was in 1978: 60% of the world pork will be produced in developing countries. **Table 5** shows this clear trend, based on data of the last seven years.

In the last seven years (1995-2001), world production of pork grew 15.59% (from 78.9 to 91.18 million tons). If we analyze this growth with respect to the world's five largest producers, we will see that it was 19.9% in China, 8.6% in the EU-15 (European Union), and 22.3% in Brazil. China and Brazil, due to their continental dimensions and grain production capacity, are prominent among the group of developing countries.

Key conditions for pork production in the future

There are many essential conditions for a country which aims at being a big pork producer in the future. If we had to stress only four conditions, we would choose the following: environmental preservation, concern with animal welfare, water availability (for drinking and grain production), and land availability to store waste and to produce basic grains for swine feeding.

The first two conditions are cultural and, fortunately, already are accepted as essential standards in some regions of the world, especially in Europe. The trend is to increase

Table 5: World pork production in developed and developing countries (million tons, 1995-2001) (adapted from FAOstat, 2001).

	World	Countries	
		Developed	Developin
1995	78.88	36.09	42.75
1996	78.83	36.02	42.80
1997	82.73	35.40	47.32
1998	87.99	37.55	50.44
1999	88.43	37.87	50.56
2000	90.90	37.18	53.73
2001	91.18	37.57	53.61
Growth (%)	15.59	4.10	25.40
Growth/year (%)	2.227 %	0.585 %	3.628 %

the adoption of these practices because it is a fair demand being made by the consumers themselves. Environmental preservation is a basic need to our own survival, making this subject unquestionable. As to the other two conditions—water and land availability—some further comments must be made.

Our planet consists of 71% water and 29% land. However, 97.24% of the water is salt water (oceans) and cannot be drunk by man or animals as it is. Fresh water is just 2.76% of the remaining water in the planet. However, not all of it is available, as 2.14% is tied up in the glaciers. What is left, and this is not much, is water stored under ground (0.61%), and in rivers, lakes, moisture in the soil, and in the atmosphere (0.01%). There are a few countries which have the privilege of having abundant fresh water. Today, about 1 billion people have no access to potable water, and 11,000 children die everyday around the world due to problems related to the lack of water or its bad quality. Thus, water availability is an essential and limiting factor to pig production. Regions with higher water availability have better conditions of producing not only swine but also other raw materials (grains) essential to their feeding.

One of the greatest limitations for the growth of swine production is waste. A pig defecates the equivalent of 2.5 people, and the use or storage of this waste is becoming a serious problem in large farms. One way of using waste is as fertilizer. Therefore, countries which have large extensions of land and adequate climate will have the advantage of using the waste as fertilizer in crops and for producing grains for feeding the pigs at a lower cost. When we look around our planet for available areas for grain crops, we can see that there are just a few, and decreasing every year. The sweeping forest destruction and fires have accelerated the process of desertification. According to the *Times World Atlas*, 1996 edition, this is alarming in Africa and Australia, as 75 and 65% of their land, respectively, suffer this problem. The continents with lower desertification are Europe (29%), North America (29%), and South America (31%).

Characteristics of the greatest world producers of swine

After seeing perspectives, trends, and the key conditions for the production of swine in the world, we will briefly comment on some peculiarities of the greatest world producers of swine.

China

Today, China has a herd of 485 million pigs producing 42.78 million tons of pork. It is the largest world producer, accounting for 46.9% of world production. Exports from China are very small—only to neighboring countries—as it consumes its production thanks to a popula-

tion of 1.3 billion people, consuming on average 30 kg of pork a year. Only 20% of the production uses modern technology, and the remaining 80% is produced in small, family-owned farms. This is why China has 477 million producers, mostly small farmers, raising their pigs for their own use. Two factors limit the possibility of exporting pork and providing for the growth of the remaining world population: foot and mouth disease and low quality carcasses. Therefore, China's trend is to increase its production to provide for the domestic market. Due to the growth of its economy, the perspective is that it will become a great world importer in the near future.

USA

The US is the second world producer. In 2001, with a herd of around 60 million pigs, it produced 8.69 million tons of pork. Consumption per capita was 30.7 kg per person. The USA has excellent conditions to increase its production, as it is the largest world producer of corn and soybeans, and has water and land availability. Due to these conditions, it has low production cost (US \$0.65 per kg live weight in large companies), and concrete possibilities to be one of the world's greatest exporters. One of its characteristics is the consolidation of production (**Table 6**), with small producers going out of business, and an increase in the participation of super-projects. It is estimated that in the next few years, 80% of the production will be concentrated in the hands of less than 15 companies. One of the problems of this consolidation is that these huge farms produce massive amounts of waste, leading some states to impede the implementation of new super-projects in order to preserve their environment and water sources.

Europe (EU-15)

The European Union produced, in 2001, 17.543 million tons of pork with an estimated herd of 118 million animals. The three major producers are Germany (3.9 million tons), Spain (2.9 million tons), and France (2.2 million tons). Together, they account for 51.5% of EU-15 production. The consumption of pork in this region is one of the highest in the world, at 44.6 kg/person/year. Due to the high density of pigs per square kilometer (36.8), EU-15 has critical waste problems, leading to "ecological" pressures for the maintenance or even reduction of the herd in some countries. The strong (and fair) demand of the consumers has contributed to a change in the production systems towards models which provide good animal

Table 6: Consolidation of the number of producers in the USA, 1970-2003 (Pig International, 1999).

Year	# Producers
1970	900,000
1999	114,000
2003	40,000

welfare and preservation of the environment. The production costs in EU-15 are high (between US \$1.00 and 1.30 per kg of live weight), and the market is protected by government subsidies and taxation of products that come from abroad.

Pork production in South America

South American countries are divided into two economic blocks: Mercosur and Andean Community (CAN), whose social-economic characteristics can be seen in Tables 7 and 8. Mercosur's GDP is 3.4 times higher than that of the Andean Community. Mercosur, as compared to CAN, has 2.67 more land, twice the population, and 1.55 times the income per capita.

Table 9 compares the social-economic characteristics of both South American blocks with the characteristics of two developed countries to give us an idea of proportions and importance. The GDP of all countries of South America is only 33% of Japan's and 13% of USA GDP. The greatest economic difference lies in GDP per capita, with the South American average being 8 times lower than the Japanese and 9.3 times lower than the American figure.

Participation of South America in the world production of pork

South America had a herd of a little over 60 million animals in 2001. This amount represented more than 6% of the world swine herd. As to pork, it produced 3.234 million tons in 2001, accounting for 3.5 % of the total world production. With Table 10 we can compare pork production in the main economic blocks, with special emphasis on China due to its indisputable world participation.

Swine herd and production in South America

Table 11 shows South American swine pork production. Brazil, the sixth world power in this sector, has 69% of

Table 10: Pork production in the large economic blocks, 2001 (L.Roppa, 2002, based on FAOstat data and personal information).

	Million tons
China	42.786
EU 15	17.543
NAFTA	11.299
Mercosur	2.553

Table 7: Social-economic characteristics of Mercosur countries, 1999 (Roppa, 2000, with data from WMF – B. Central do Brasil, FAO, Atlapedia).

Country	Territory (km ²)	Population (millions)	GDP/capita (US \$)	GDP (mill US \$)	% GDP
Argentina	2,766,889	36.57	7,730	282.7	30.0
Brazil	8,511,965	167.98	3,305	555.2	59.0
Paraguay	406,752	5.35	1,588	8.5	0.9
Uruguay	176,220	3.31	6,283	20.8	2.2
Chile	756,626	15.02	4,926	74.0	7.9
Mercosur	12,618,452	228.23	4,124	941.2	100.0

Table 8: Social-economic characteristics of Andean community countries, 1999 (Roppa, 2000, with data from WMF – B. Central do Brasil, FAO, Atlapedia).

Country	Territory (km ²)	Population (millions)	GDP/capita (US \$)	GDP (mill US \$)	% GDP
Bolivia	1,098,581	8.14	1,044	8.5	3.0
Colombia	1,138,914	41.56	2,194	91.2	33.1
Ecuador	283,561	12.41	1,103	13.7	5.0
Peru	1,285,215	25.23	2,366	59.7	21.7
Venezuela	912,050	23.70	4,320	102.4	37.2
CAN	4,718,321	111.04	2,481	275.5	100.0

Table 9: Social-economic characteristics of Mercosur, CAN, Japan, and USA, 1999 (Roppa, 2000 with WMF-OCDE-Bird-FAO-B.Central do Brasil, Atlapedia and ALCA data).

	Territory (km ²)	Population (millions)	GDP/capita (US \$)	GDP (mill US \$)	% GDP
Mercosur	12,618,452	228.23	4,124	941.2	77.3
CAN	4,718,321	111.04	2,481	275.5	22.7
Total	17,336,773	339.27	3,586	1,216.7	100
Japan	372,818	126.50	28,932	3,660.0	
USA	9,809,000	276.22	33,668	9,300.0	

Table 11: South America pork production, 2001 (adapted from FAOstat data, 2001 and personal information).

Country	Production (million tons)
Brazil	2,165.000
Chile	303.000
Argentina	214.000
Colombia	81.250
Paraguay	148.410
Ecuador	98.300
Venezuela	118.000
Peru	94.000
Bolivia	76.425
Uruguay	26.000
French Guyana	1.245
Suriname	1.190
Guyana	500
Total	3,234.26

pork production. Chile is in second place, with an efficient and modern pig production, producing 9.7% of total. Argentina comes in third place with 6.8% of pork production and has a promising future due to its extensive grain production (corn and soybean).

Main advantages of swine production in South America

Some South American countries have very interesting competitive advantages as compared to other areas around the world. Their present participation within the continent show which are the most and which are the least competitive countries. As common characteristics and advantages of all these countries, low cost of land, facilities and labor, favorable weather, and the possibility to increase domestic consumption are emphasized. As individual advantages, Brazil and Argentina are stressed due to their superior grain production (corn and soybeans). Bolivia and Paraguay are good producers, and the countries around these four producers benefit from imports at lower production costs. This is becoming increasingly possible due to the advance of the negotiations for the establishment of a free trade agreement among South American countries (ALCSA).

The advantage of low density of swine

We can have a better understanding of the positive perspective of growth in swine production in this region by

comparing the characteristics of China, USA, EU, and South America (**Table 12**). South America has only 3.4 pigs per square kilometer, compared to 38.4 in EU-15, clearly demonstrating the possibilities of production expansion. And due to its low consumption per capita, this growth does not have to be necessarily based on exports, but rather on the domestic market. Brazil stands out among South American countries because of its low production cost and for having only 4.34 pigs per square kilometer. It is important to associate these characteristics with the fact that Brazil is eradicating foot and mouth disease, and that it is free of classic swine flu in some regions, and also for not having PRRS.

The advantage of water availability

As previously discussed, only 31% of the South American continent has desert areas or areas in desertification. This is an important competitive advantage as compared to Asia, Africa, and Oceania, which have 45, 65 and 75%, respectively. In fact, only 4% of the South American territory has desert or arid climate. Another advantage is its fresh water availability. If we look at the largest river basins around the world, two are located in South America—the Amazon and Plata/Parana (**Table 13**). Brazil itself has 8% of all the fresh water available in the planet, and 80% of this water is in the Amazon.

The advantage of land availability for crops

Land dimensions and low desertification provide this region of the planet with a huge potential for food production. Despite producing only 3.4% of the world pork, South America stands out in grain production. As can be seen in **Table 14**, Brazil is now the second world producer of soybeans and the third in corn production. Argentina is the fourth producer of corn and the third of soybeans. Adding all South American countries, we can see they produce 8.5% of the corn and 34.3% of the soybeans

Table 13: Largest river basins in the world (World in figures, V. Showers, 1973).

River	Area (km ²)	Flow (m ³ /s)
Amazon	6,150	175,000
Yangtze	1,827	32,190
Plata/Parana	3,100	22,900
Yenisei	2,619	18,000
Mississippi	3,222	17,270

Table 12: Comparative advantages among the greatest world swine producers, 1999 (L.Roppa, 2000).

	China	USA	EU-15	South Am.	Brazil
Pigs/km ²	45.5	6.4	38.4	3.4	4.3
Consumption (kg/pers./year)	32.5	30.5	43.4	7.0	11.2
Production cost (US\$/kg/LW)	1.20-1.40	0.65-0.75	1.00-1.20	0.55-0.90	0.50-0.55

Table 14: World largest producers of corn and soybeans, 2001 (adapted from FAOstat, 2001).

Country	Extension (1,000 km ²)	Production (1,000 tons)	
		Corn	Soybeans
USA	9.80	253.7	75.3
China	9.59	126.2	15.4
Brazil	8.51	39.6	34.5
Argentina	2.78	14.9	22.5

Table 15: Participation of the Mercosur in the world production of corn, soybeans, and pork, 1999 (based on FAOstat data).

	Corn (1,000 ton)	Soybeans (1,000 ton)	Pork (1,000 ton)
World Production	600,418	154,323	88,429.0
Brazil	32,178	30,904	1,751.6
Argentina	13,183	18,000	155.6
Paraguay	984	3,303	120.0
Uruguay	242	16	27.0
Chile	624	0	249.0
Total MERCOSUR	47,211	52,223	2,303.20
World (%)	7.8	33.8	2.6

Table 16: Participation of the Andean Community (CAN) in the world production of corn, soybeans, and pork, 1999 (based on FAOstat data).

	Corn (1,000 ton)	Soybeans (1,000 ton)	Pork (1,000 ton)
World production	600,418	154,323	88,429.0
Colombia	974	44	135.0
Ecuador	512	76	113.8
Peru	1.057	3	93.0
Venezuela	1.024	10	109.4
Bolivia	613	762	73.6
Total CAN	4,180	895	524.8
World (%)	0.7	0.6	0.6

Table 17: Degree of land use in South America, 1996 (FAO - Database, Land Use, 1996).

Country	% with agriculture	% without agriculture
Argentina	60.9	37.6
Brazil	28.7	70.3
Paraguay	58.9	38.7
Uruguay	83.6	15.0
MERCOSUR	38.0	60.7
Bolivia	26.2	72.5
Colombia	39.1	52.1
Ecuador	28.7	69.0
Peru	24.3	75.3
Venezuela	24.0	72.7
CAN	28.5	68.2
CAN-MERCOSUL	35.3	62.8

in the world. These data are shown in detail in **Tables 15** and **16**.

Which South American countries can expand their agricultural area? **Table 17** shows the degree of present use

of land in South American countries, and it is possible to conclude that Argentina, Uruguay, and Paraguay already well use their crop land and do not have a high potential for expansion. In the other countries, and especially Brazil, due to its dimensions, the possibilities of expansion

evidence the excellent potential of this area. In Brazil, with more than 46% of the land of South America, agriculture has a great potential for growth as this country uses only 28.7% of its territory.

Advantages of low production costs

Due to self-sufficiency in grain production and the low cost of its facilities, labor, and land, several South American countries have competitive prices comparable to other regions of the world. In **Table 18**, the production costs of some countries around the world are listed, according to a study published in *Pig International* magazine, (which referred to Iowa's Pork Industry Dollars and Scents, 1998 as a source). It can be seen that Brazil has the lowest production cost (US \$0.62 per kg live weight) as compared to other countries. Actually, it must be mentioned that, in grain-producing areas in Brazil (Central Western region), the production cost reaches US \$0.50 per kg live weight, one of the lowest production costs in the world.

The production costs of several South American countries are listed in **Table 21**, according to information given to the author by the breeders associations of each country. The numbers are clear and evidence the excellent competitiveness of some South American countries to struggle for the market of world exports of pork.

Table 18: Production costs per country (Iowa's Pork Industry Dollars and Scents, 1998).

Country	(US \$/kg LW)
Taiwan	1.54
China	1.32
Poland	1.21
Denmark	1.19
Australia	1.04
Canada	0.79
USA	0.77
Brazil	0.62

Table 19: Production cost in South America, 2002 (based on each country's Breeders Association data, 2001).

Country	(US \$/kg LW)
Brazil	0.55
Argentina	0.73
Chile	0.70
Venezuela	0.85
Peru	0.97
Colombia	1.10

Table 20: Comparison of meat consumption in the world, 1999 (based on FAO data, 1999).

Meat	World	South America
Pork	14.59 kg (42%)	7.8 kg (13.5%)
Chicken	11.25 kg (30.2%)	20.0 kg (35.0%)
Beef	9.8 kg (27.8%)	29.5 kg (51.5%)

Main problems of swine production in South America

Some of the main problems of swine production in South America are inherent to developing countries' economies. In this sense, credit difficulties, high taxes, economic instability, and high interest rates are factors which hinder an accelerated growth of production. Among the remaining problems, the traditional low consumption of pork is implicated. In South America, the population prefers to eat beef and chicken. Pork consumption is indeed very low. This is a problem today, but it may be a great opportunity in the future. If we compare what happens in South America with the rest of the world (**Table 20**), we will see opposite situations—the meat preferred around the world is pork, with 42% of total meat consumption, whereas in South America pork accounts for only 13.5% of meat consumption. In the case of beef, it is just the opposite—it is the most consumed in South America (51.5%), and the least in the world (27.8%).

Table 21 shows pork consumption in South American countries and compares it to some developed countries with higher income per capita. Chile has the largest consumption on the continent (16.0 kg per person per year) and it is the only country in which consumption is higher than the world average. These figures show the growth potential of the swine industry because, if a country such as Brazil, with its 175 million inhabitants, jumped from its present 11.2 kg pork consumption to the world average, an increase of 577,500 tons of pork would be necessary. This means that this country can increase its production merely thinking in terms of providing for its domestic market.

There are several causes for this low consumption:

- Higher price as compared to chicken
- Higher retail profit margins as compared to chicken

Table 21: Pork consumption in South America in 2001 (breeders associations and FAO data).

Country	kg/person
Chile	16.5
Brazil	11.2
Uruguay	10.2
Argentina	7.0
Peru	3.8
Colombia	2.6
World	14.5
Europe	43.4
USA	30.5

- Low buying power of the population
- Less publicity
- Lower use in food services
- More difficult to cook
- Higher consumption of further-processed products
- Taboos related to its quality

The solutions of these problems demand the following:

- Improvement of the economy of these countries to increase buying power.
- Discussion of profit margins with the large retailers; in Brazil, the profit of the supermarkets on pork is twice the profit in France.
- Increasing fresh pork consumption. In South America, 70% of the pork is eaten as salami, hams, pancetta and other processed products. This makes it difficult to increase consumption as further-processed products are more expensive and their sales are limited to social classes of higher buying power. As these people are a minority in South America, a great part of the population is deprived of its consumption due to its high price.
- Improving the presentation of fresh pork cuts and developing ready-to-cook products adapted to the modern consumer, who has little time to prepare food.
- Certifying the origin of the meat through legitimate organizations in order to guarantee the purchase by the consumer of a good quality product originated from modern and healthy farms.
- Breaking taboos against pork. One of the most important taboos which inhibit pork consumption is the lack of knowledge of the qualities of the pork produced today. It is important to disseminate studies, such as the one shown in **Table 22**, showing the decrease of fat and calorie levels in pork during the last 20 years.
- All genetic, nutrition, and management advances must be disseminated in constant marketing campaigns, and

in lectures to health professionals and human nutritionists. These campaigns must also be done in supermarkets, grocery stores, and restaurants to allow the population access to real information on the superb quality of this product.

South American exports of pork

South American exports are very small and represent only 4.2% of world exports. More than 95% of this volume is exported by Brazil (80%) and Chile (15%), whereas the remaining countries are importers. Argentina is the largest importer on the continent. Import trade is done mostly within South America, provided by Brazil and Chile. Brazil is one of the main exporters in the world, with the fourth position in the past two years (**Table 23**).

In order to become a large pork exporter, South America must intensify its efforts in the following areas:

- Improvement of carcass quality
- Intensification of foot and south disease and swine influenza eradication campaigns in the countries still plagued by these diseases
- Restriction of the use of antibiotics
- Provision of animal welfare through improved facilities and management practices, satisfying consumer and animal demands
- Protection of the environment through good waste management and careful planning of facilities; protection of water sources and correct use of land; avoiding the misuse of these competitive advantages
- Work at international politics to decrease the subsidies given by developed countries to their agriculture in order to open the market for countries with higher competitive power.

This last issue is still one of the weakest points in globalization, restricting the opening of the world market due to the insistence of some countries to protect their markets through the persistent policy of subsidies to their own inefficiency.

Table 22: Evolution of pork quality, 1963-1990 (National Pork Producers Council, USA).

Year	Fat (g/100g)	Calories (kcal/100g)
1963	34.8	413
1983	13.7	237
1990	8.1	194
1994	6.2	187
Reduction from 1963 to 1994 (%)	82.2	54.7

Table 23: Swine meat main world exporters, 1000 ton (USDA-ABIPECS, 2002).

Country	2001	2002 (prospective)
EU-15	1.220	1.320
Canada	710	730
USA	699	649
Brazil	265	350
China	110	145
Others	539	568
Total (world)	3.518	3.762

Conclusion

Based on all of the above, the competitiveness of some South American countries as compared to the rest of the world becomes evident. Their climate, land and water availability, grain production, and low production costs determine their competitiveness. South America has a great potential to increase its pork production, not only to provide for the domestic market, but also to expect a larger participation in world exports. Therefore, the continent has the necessary conditions to accept the challenge of a growing demand for food, and the unavoidable growth of the world population.

