Where Will Pork Be Produced? - A European Perspective

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▪ Introduction

To give a European perspective on pork production we must first ask - who or what is a European in the new century? Although everyone has a firm view of the geographical definition, the geopolitical reality is a current European Union (EU) of 15 countries, plus a further 5 with invitations to join, and another group waiting in the wings. By the end of the first decade of the next century, the EU could be a formidable heterogeneous group of between 25 and 30 countries. I will try, with help and information from a number of European colleagues, to present a balanced overview of where Pork will be produced in the New Century.

▪ A Brief Review Of World Pig Production

World Inventory

The Food and Agriculture Organisation (FAO) breakdown of world pig inventory by continent is shown in Table 1. This shows that the world pig population of over 956 million is dominated by the continent of Asia, followed by Europe. The Americas account for a total of 16% (153.1 million pigs).

Total world pigmeat production in 1998 was over 84 million tonnes (Table 2), with 44 million tonnes in Asia, 24.9 million tonnes in Europe, and North America with approximately 10 million tonnes. FAO recently predicted in 1999 world pigmeat production of 86.6 million tons.

Table 1. World inventory by Continent - 1998 (*Source F.A.O., 1999)*

Continent	Pigs, millions	% Share
Asia	577.2	60.3
Europe	198.8	20.8
North America	93.5	9.7
South America	59.5	6.2
Africa	22.3	2.4
Oceania	5.2	0.5
Total World	956.5	100.0

Table 2. Pigmeat Production - 1998 (*Source F.A.O., 1999)*

Rank	Country	Production million tonnes/year
1	China	36.9
2	USA	8.6
3	Germany	3.5
4	Spain	2.5
5	France	2.3
6	Poland	1.8
7	Brazil	1.69
8	Netherlands	1.67
9	Denmark	1.63
10	Italy	1.4
	World	84.1

Leading Producer Countries

The largest producer in the world is China with an inventory of 485.6 million, followed at some distance by the USA and Brazil. There then follows a group of European countries headed by Germany, Spain and Poland. Vietnam, with 18.1 million will be a surprise entry as the seventh largest producer in the world, followed by the Russian Federation with 17.3 million pigs. The top ten countries are completed by India and Mexico. When it comes to pigmeat production, the order changes because of efficiency of production. China still dominates with 36.9 million tonnes, followed by the USA with 8.6 million tonnes; Germany moves up to third place with 3.5 million tonnes, followed by Spain with 2.5 million tonnes.

Table 3. Leading Producer Countries- 1998 (*Source F.A.O., 1999*)

Rank	Country	Million head in inventory
1	China	485.6
2	USA	60.9
3	Brazil	31.4
4	Germany	24.8
5	Spain	19.3
6	Poland	19.2
7	Vietnam	18.1
8	Russian Fed.	17.3
9	India	16.0
10	Mexico	15.5

Leading Meats

Pig meat is the number one meat in terms of world meat production (Table 4), at over 84.1 million tonnes in 1998, followed by 53.6 million tonnes for beef and veal combined. This is closely followed by Poultry at 51.2 million tonnes - a long way ahead of mutton and lamb at 7.5 million tonnes. Other meats include turkey, goat and buffalo.

Table 4. World Production of Leading Meats- 1998 (*Source F.A.O., 1999*)

Meat	Million Tonnes/ yr
Pigmeat	84.1
Beef & veal	53.6
Poultry	51.2
Mutton & lamb	7.5
Turkey	4.7
Goat	3.6
Buffalo	2.9

World Meat & Pig Meat Consumption

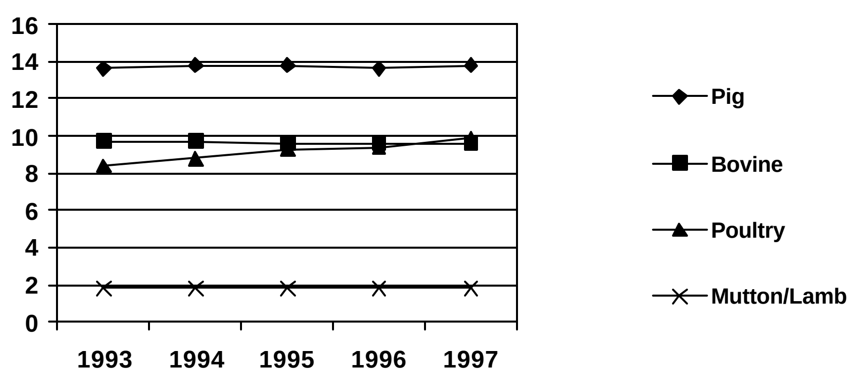

Figure 1. World Meat Consumption, kg/captia/yr (*Source F.A.O., 1999)*

Trends in meat consumption from 1990 to 1998 show significant increases in both Pig and Poultry meat, with a reduction in Beef and Veal, whilst Lamb intake was static. In 1997 world wide pig meat consumption per capita in kg was 13.8 (13.6 in 96), and poultry meat at 9.9 kg (9.4 in 96). Overall Pigmeat had a world share of 42%, with poultry at over 26%. Leading countries in pigmeat per capita consumption are mainly European, led by Denmark (57.4 kg), Spain (56.2 kg), and Germany (51.9 kg). Significant increases in recent years now show China with per capita consumption at 28.4 kg/year, with the USA at 27.9 kg.

Exports and Imports of Pigmeat

It is worth noting that over 90% of pigmeat consumed is produced within the immediate locality, so that only relatively small amounts are traded on a commodity basis worldwide. However, several countries - mostly European based - are major exporters of pigmeat. The leading country is Denmark, where pig farming plays a vital role in the economy, and the country is rated as 490% self-sufficient. On a similar basis, the Netherlands self-sufficiency rate is 240%, and, in Belgium 220%. Inter-community trade within the EU provides a basic market for Denmark, with large exports to Germany, and a long history of export of Danish bacon to the UK.

Worldwide, the major importers of pigmeat have been Japan, Hong Kong, the Russian Federation, Greece and the USA. Although the USA imports large amounts of pigmeat, in 1995 the U.S. became a net exporter of pigmeat for the first time. Historically, the export-oriented countries have seen their pig industries grow whereas pork production in those oriented towards imports has declined or stabilised. Modern techniques, allowing long-distance transportation of chilled meat as well as frozen meat, have introduced the possibility that previously minor producers (Australia, South Africa) will become significant exporters in future. But exports are predominantly of prime cuts, meaning the exporting country needs a large domestic market to absorb other parts of the carcass.

Pig disease remains one of the main barriers to export markets. However, government agencies of the importing countries have become increasingly ready to accept regions of a country, rather than the complete country, as a health entity when setting import protocols. This will assist the future exporting credentials of Latin American countries such as Mexico and Brazil.

Even so there will be public attitudes to take into account. Already in Europe complaints have been heard that, to quote the Dutch, "we sell the meat to other people and keep the manure" (except that they do not use the Dutch word for manure). In other words the political consequence of the environmental issues associated with livestock production have become particularly difficult to solve in exporting regions.

▪ Factors Affecting Growth and Location of World Pigmeat Production

There are a number of key factors influencing growth and location of pigmeat production in the next century. Demographics, population growth and location are major driving forces - especially in Asia. In China population growth alone could account for an additional requirement for as much as 2 million tonnes of pigmeat per year. The pigmeat sector is also influenced by regulations laid down by the World Trade Organisation (WTO). Following on from GATT, this organisation is now the major regulator of world trade in controlling tariffs, quotas and export licences. Overall, the trend is towards liberalisation of world markets, with more access and less protection for individual countries.

The next century will also see increasing emphasis on broader aspects of the environment - notably a move towards reduction in pollution levels, and more consideration of animal welfare. Coupled with these is a growing concern from the consumer on food safety, especially following the European experience with BSE. There is worldwide concern over salmonella, *E. coli* and other food contamination scares. Traceability of the product from the farm through the Pork Chain to the point of purchase is now a real customer concern, in addition to packaging and presentation. Consumer purchasing power and the demand for processed and convenience pig meat products are major factors in the marketplace.

Disease outbreaks such as Foot and Mouth Disease (FMD), and Hog Cholera also have a large influence on location of pig production in a world-wide context.

Issues of food safety and traceability will be exploited increasingly by meat marketers seeking to differentiate their product from the commodity supply. It is at least arguable that success in this direction will support local production close to the centres of consumption in western Europe, because imported products may not be as secure or as traceable and food retailers do not like taking risks, even if imports are cheaper. Another consideration is that the European Union expects to introduce further restrictions on pig production techniques in the name of animal welfare. A scientific report is currently with the European Commission in Brussels for evaluation. Whether through regulation, marketing restrictions or advertising, do not expect EU countries and consumers to be willing in the future to accept imports of pork produced according to lower welfare standards.

In broader terms, the adoption of technology frequently depends on finance and capital availability, and, world-wide, the traditional gap in levels of efficiency is closing very rapidly. This efficiency relies, in many countries, upon human resources. This is a major concern, especially in developed countries, where recruitment and retention of production staff can be a constraint. Finally, growth may be impeded by insufficient slaughter capacity (USA), a shortage of good quality water (USA), currency and exchange rates (UK), or a lack of basic infrastructure and transportation to distant markets (Brazil). Above all, financiers and investors prefer countries with political and economic stability.

▪ Potential Growth Areas

People's Republic of China

China occupies a dominant position in the world market as previous figures disclose. The vast and growing population is a driving factor in increasing demand, as well as the fact that pigmeat is the first choice (67%) of meat.

Growth will mainly be for domestic consumption, especially in fresh meat; only relatively small amounts of pigmeat for export are forecast. Overall, 85% of pigmeat is consumed as fresh meat, with the balance of 15% processed. Production can be described as 'low- tech', with 78% of producers with less than 90 pigs. Households and small farms remain the main method of production, with widespread use of by-product and opportunity feeds. However, there is some industrial production in provinces such a Guangdong, which supplies the Hong Kong market.

The biggest concern in China relates to grain. Anxious that there should be enough grain for human consumption, the Chinese Government has embarked on a campaign to reduce the extent of grain feeding to livestock. Pigs are a particular target because they are seen as less efficient grain converters than poultry and less able to utilise other feeding stuffs than cattle. An upgrade of abattoirs, sanitation and hygiene systems is central to a major drive for modernisation and improved efficiency. However, foot and mouth disease (FMD) is endemic in the country, and could limit export opportunities.

The United States of America (USA)

The USA is now a world leader in pig production and technology. This is based on low cost corn, cereals and protein. Energy costs are generally lower relative to the rest of the world, and there continues to be very good access to finance and capital. Major restructuring is taking place with growth of mega-systems, vertical integration and strong linkages in the marketing chain between producer and consumer. Following adaptation and adoption of new technology, the USA has become a main centre of low cost production.

Recently there have been questions over slaughter capacities and environmental and pollution issues; all are major constraints. The USA is now a net exporter of pigmeat, which is essential for further growth; but there is a need for improvement in meat quality as well as a further reduction in drugs and residues. In the meantime, structural change continues and according to one analysis, the major expansion of the US sow herd has already taken place ahead of environmental clampdowns. Relatively little opportunity remains for corporate producers to grow in the traditional Hog Belt and they face huge problems of water, labour and transport by moving to extremely isolated areas.

This has been suggested as one reason for the spate of consolidation through take-overs seen in 1999.

Canada

The background and opportunities for growth in Canada have been dealt with in a separate paper in the programme presented by Dr Larry Martin, describing the Western Canadian Advantage. (see paper in these proceedings, pg. 17.)

Brazil

This is an emerging country in pig production, with a growing population and large areas of agricultural land available, including some areas still undergoing reclamation. Brazil is a corn and soybean producer for both domestic consumption and export. Pigmeat consumption is relatively low, at 9.5 kg per capita, with up to 70% of pig meat processed and only 30% consumed as fresh meat. Brazil currently exports some pigmeat to Hong Kong, Argentina and Uruguay. Labour costs are low by world standards, creating relatively low cost production. However, Foot & Mouth Disease and Swine Fever are widespread, which may restrict exports. Distance from world markets is also a constraint. Some observers have also raised questions about lack of infrastructure and unfavourable conditions for capital investment.

The European Union

The 15 EU countries are characterised as a group of mature industries with fairly static production and static consumption. Overall the EU is more than self-sufficient in pigmeat production, with a large volume of intra-community/trade. Major exporters include Denmark, Netherlands and Belgium/Luxembourg. When compared with the USA, farms are relatively small, with high cost of production. The leading pig producer is Germany, which has been involved in structural change and re-organisation as the former East Germany has been integrated into that country. Major growth areas for pork production in the EU include Spain and France. Significant reductions are predicted in the breeding herds of the Netherlands and UK.

The EU consistently produces more Pork than it consumes and its market dynamics are extremely finely balanced. Even a relatively small change in export sales, for example, can trigger a substantial adjustment to producer prices. In this context it is significant that the EU plans to continue to reduce its export refund payments (in order to comply with WTO requirements). The European Union is the world's largest exporter of pigmeat products (processed products, offal and fat) with a total of about 1.2 million tonnes in 1998. Around half a million tonnes were exported with export refunds.

Export refunds and aid for private storage are the only support instruments available to the European Commission for the pigmeat sector. Since Spring 1998, export refunds have been reintroduced for pig carcasses and cuts in the hope of restoring market balance. The European Union must observe quantitative and budgetary ceilings laid down in the WTO arrangement when granting export refunds in the pigmeat sector. Towards this objective, a simplified list of eligible products and a system of export licenses was introduced in July 1995. Unused licenses (quantities) from former GATT years (July to June) can be brought forward and added to the present budget without exceeding WTO limits.

In recent remarks, Dr. Rainer Nagel, chairman of the EC Pigmeat Management Committee, called export refunds "the most important supporting instrument available to the Commission for dealing with fluctuations in the pigmeat sector." He reported that 542,000 tonnes had been exported with refunds in 1995, but only 463,000 tonnes in 2000. The years 1997 + 1998 had seen an increase in exports with refunds, but this trend has been reversed in 1999 (about 877,000 tonnes with refunds and 786,000 tonnes without).

To comply with WTO rules the European Commission needs to reduce refund support for pigmeat exports. Dr. Nagel's own view is that there will probably be a further reduction in these tonnages as a result and said EU countries needed to "export more without refunding."

Major constraints in the EU include concern for the environment, regulation of planning and control of pollution. In a number of countries there is considerable pressure from political parties, which have a strong Green emphasis. Legislation is already in position on animal welfare and on the use of antibiotics in animal feed. Currently the Common Agricultural Policy (CAP) is guided by a plan called Agenda 2000, which includes integration of the former Eastern European countries into the EU, and there is concern over the cost of this process.

Potential growth areas include Spain, which has relatively low cost production, with favourable climatic conditions and available land. Feed costs can be compared with the USA, and there is significant growth of large-scale farms based on multi-site systems. Forecasts from WTO indicate further reductions in long-term feed costs after the year 2000.

The last ten years have also seen considerable growth in outdoor production, especially in UK and France - partially for economic reasons, but with additional pressure from animal welfare considerations. Outdoor production has very specific requirements for both climate and soil conditions which limits growth in Western Europe to the UK, France and some areas of Denmark, Spain and Portugal.

Performance figures from the Meat & Livestock Commission (MLC) in the UK indicate that results from outdoor herds are only slightly below those of indoor herds, but the outdoor system can be established at much lower capital cost.

Other Countries - Eastern Europe

Poland, of the former Iron Curtain countries, appears to be the most likely of the growth areas. During the period of Communist rule, Poland retained a large number of private farms, and has considerable cereal production, but also a few large State farms. Structural re-organisation would be essential to compete with existing EU countries when Poland joins the EU. The Polish economy appears to be in reasonable condition, and the country has a strong cultural background of pigmeat production, processing and consumption. Polish pigmeat quality is currently too poor for the EU market. Only considerable funding from abroad, with an associated transfer of technology, can correct that within an acceptable time frame.

Since 1947 Romania has been a major pigmeat producer in Eastern Europe, with large State farms, and the land and climate to grow corn and soybeans to American standards. However, since 1989, the country has been faced with persistent political and economic problems, and has failed to attract overseas investors into a national privatisation program. Foreign investment holds the key in Poland and in Romania. The opportunities are being grasped by meat companies from the USA (Smithfield), Sweden (LRF) and Spain (Campofrio) and also by production-oriented groupings from Denmark.

▪ Low Cost Production - Can Europeans Compete?

Completely accurate cost comparisons between countries are difficult to obtain for a number of reasons. These difficulties include difference in recording standards and data, herd size samples, carcass weights, costing methods and variations in currency exchange rates. Cost of production provides a good guide to where global pig production is likely to be located, but is not the sole concern. Of equal importance are meat packing and processing facilities, transport, storage and export handling, as well as promotional and marketing expertise.

A number of studies in this area have been produced in the past few years including *"Prospects for Hog Production and Processing in Canada"* (1998), prepared by Dr Larry Martin, Dr Zana Kruja and John Alexiou (which will also feature in the program in this seminar). Iowa State University (ISU) (1998) produced *"Iowa's Pork Industry; Dollars and Scents,"* which took a broad look at Iowa's Pork industry in a wider context. In Europe, the Meat and Livestock Commission (MLC) report in 1994 on the *"Competitive Position of the British*

Pig Production Industry" was authored by C P Baldwin & M J Sloyan. This was followed in 1998 by the MLC report on *"Pig Cost competitiveness in Selected European Countries"* by C P Baldwin.

Table 5. Critical Cost[1] per kg Carcass Weight, 1997 (*Source MLC, 1999*)

£/kg	Denmark	Holland	France	Ireland	GB[2]
Feed	0.52	0.51	0.59	0.64	0.65
Labour	0.08	0.08	0.07	0.08	0.11
Building & Equipment	0.08	0.02	0.07	0.02	0.08
Miscellaneous & Environmental	0.16	0.17	0.14	0.14	0.08
Total cost/kg dw	0.84	0.78	0.87	0.88	0.92
Cost adjusted to a constant 70kg	0.86	0.82	0.90	0.88	0.92

[1] Critical cost price includes feed an other variable costs together with paid labour, repair costs for buildings and equipment, and other fixed costs for which payment is made. It does not include imputed costs, depreciation or any costs where a monetary transaction does not take place.
[2] Great Britain

The first MLC report (1994) covered four countries - Great Britain, Denmark, France and Netherlands - and concluded that the Netherlands was the lowest cost producer of pigmeat in the EU by a significant margin. The second MLC report (1999) was extended to include Ireland (Table 5). Key points included:

- In general, levels of physical performance have converged across the countries studied.
- Sow productivity is currently very similar in most countries, although it remains lower in France.
- While all countries have made progress since 1993, the rate of increase (compared with Great Britain) has been quicker in Denmark, and particularly in the Netherlands.
- Feed conversion ratios in the feeding herd remain in a broad range, with Ireland recording the best level of efficiency, and France the least. All countries have made improvements in recent years. Recorded growth rates are low in Great Britain relative to Denmark and Holland. Finished pig and average carcass weights have increased in all countries, but still cover a wide range. Great Britain and Ireland remain the lightest at 69 kg;

Denmark is the middle range, with France and the Netherlands operating at the highest carcass weights, which are approaching 90 kg.

- Comparative costs indicate that, in 1997, British producers had higher costs relative to all the other countries studied (Table 5). The Netherlands had the most substantial cost advantage at 14 pence/kg carcass weight. Denmark had an average cost advantage of 8 pence/kg, and Ireland 4 pence/kg.
- Feed costs were generally higher in Great Britain than elsewhere, and particularly compared with the Continental EU countries. In the EU countries, producers often benefit from large feed plants working in small distribution areas with low transportation costs. Producers and feed plants also benefit from being part of, or supplying, producer co-operatives. Feed costs were lowest in the Netherlands and Denmark. This represents an erosion of the feed cost advantage that the Netherlands previously had over Denmark.
- Labour costs were higher in Great Britain, principally due to the lower use of family labour. It is estimated that family labour in Great Britain accounts for 35% to 40% of total labour input, whereas in Holland and Denmark family labour accounts for 65% of total labour input.
- Among the other major costs analysed is the additional cost of providing loose housing for sows on the 40% of British pig farms, which previously used stalls or tethers. This is estimated to be approximately £214 million (approx. $520 million Cdn.) in perpetuity. The estimates are based on a building cost of construction for loose housing of around £500 per sow place, a building life of 15 years, annual building maintenance costs of 10% of the original capital cost, and additional feed and management costs of £25 per sow per year. The cost for an individual producer making the change is therefore around £2.50 per pig, equating to £1.00 per pig for the whole industry. The Danes, Dutch and French on the other hand have had considerable environmental costs and some welfare-related costs added to their cost of production. This has offset some of their other cost advantages.

The report draws attention to the fact that the Netherlands, as lowest cost producer in Europe at 82 pence/kg carcass weight ($2.00 Cdn), compared unfavourably with estimated USA costs of 75 pence/kg carcass weight ($1.80 Cdn) for average production, whilst the top 10% most efficient producers were operating at an equivalent of 62 pence/kg carcass weight ($1.50 Cdn)- an advantage of over 20% to the average US producer (Table 5).

Summary and Conclusions

The key drivers in further growth of pig production will be population growth, leading to increased consumption, coupled with efficient low cost production. Containing costs depends largely upon access to locally produced corn, cereals and protein. Global trade in pigmeat is coming increasingly under the control and legislation of the WTO, with the removal of trade barriers, tariffs and further liberalisation.

Technology has been transferred over the past 10 years throughout the world, and there has been a narrowing of the gap in overall efficiencies between countries. Growth in pig production seems to be at a slightly faster rate in developing countries. FAO projections for the end of the century suggest that world pigmeat consumption will increase at a rate of around 2.3% a year, with growth in the developing countries at over 4%, but less than 1% in developed countries.

There will certainly be greater scrutiny over the environment and potential pollution, with the consumer becoming more aware and more critical of food safety and pigmeat quality. Competition can also be anticipated in the global market from other foods, such as poultry meat, and from a growth in vegetarianism.

With all of these factors in mind, I conclude that North America will be the prime location for pigmeat production in the first decades of the next century. The USA will lead the way with a close challenge from Canada. In Europe, growth is most likely to come from Spain, although Denmark has ambitious plans for expansion and further export. What is very clear is that this is a very complex situation, i.e. that pigmeat production has become a globalised business, and that pigmeat is still the most popular of meats worldwide.

Acknowledgement

I would like to thank PIC(UK) for providing me with information and PIC(USA) for preparing the visual presentation.

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